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WEBMASTER®

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Cover image by Robert Atkinson

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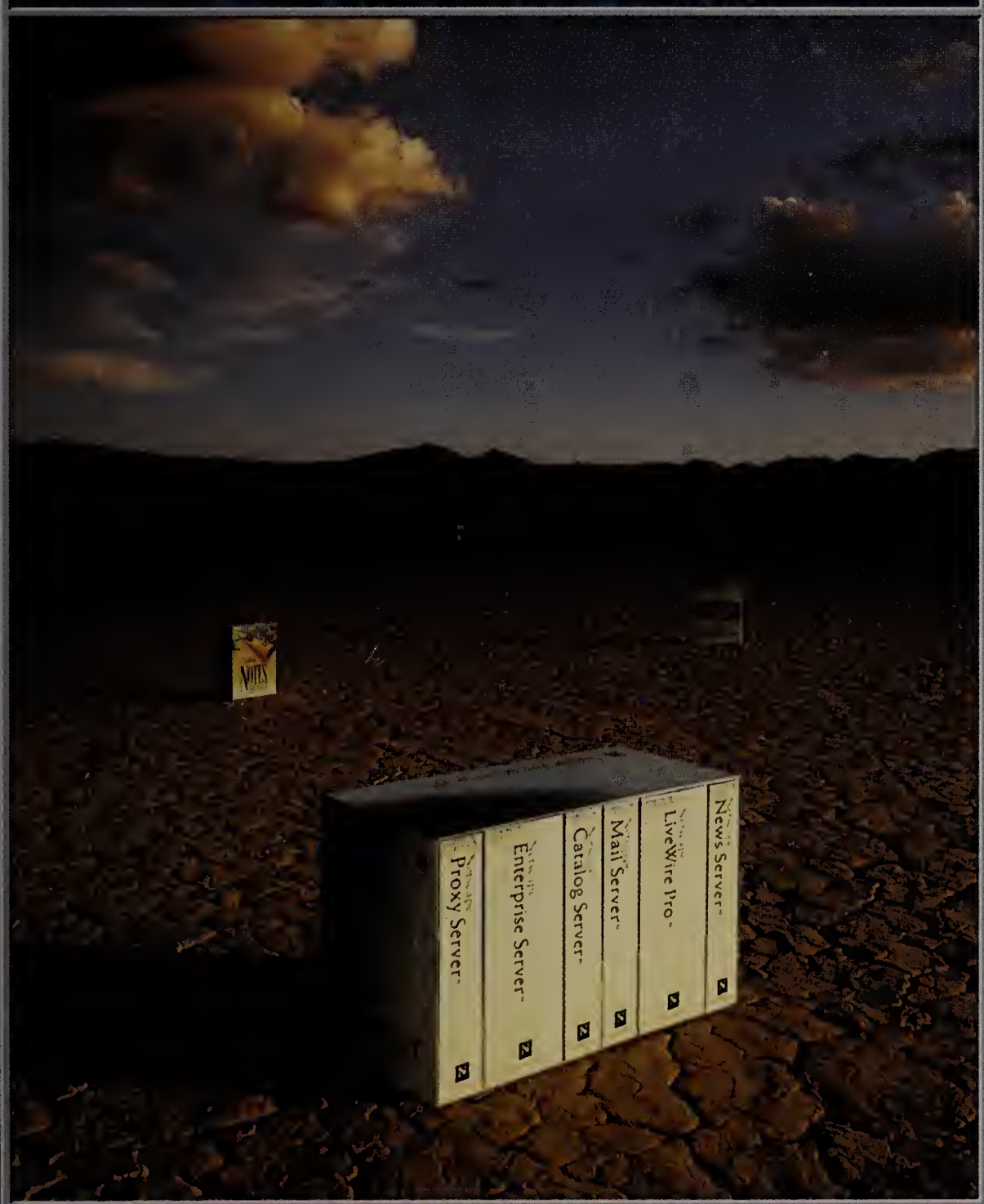

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"because they rock," and other

technical reasons why Netscape

uses Silicon Graphics WebFORCE servers,

according to Webmaster Robert Andrews.

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While obsessing about my bald spot

I did a Lycos search and found Say No Naturally with the latest on treatments, research and herbal care for thinning hair. Next, since the Bald-o-Meter site put me in "stage five" of male pattern baldness, I thought I'd search "toupee." But then I saw Je Suis "Bald" – an on-line journal from a Québécois. The writer's existential triumph over hairline angst made me click into Bald Pride, where chatters encouraged me to shine. Pumped, I dove into Lycos Pictures & Sounds and found photos of proud bald celebrities, authors and athletes – not to mention the president of RayTone Records, who was seeking new talent. After uploading one song from my demo **I landed a major recording contract.**

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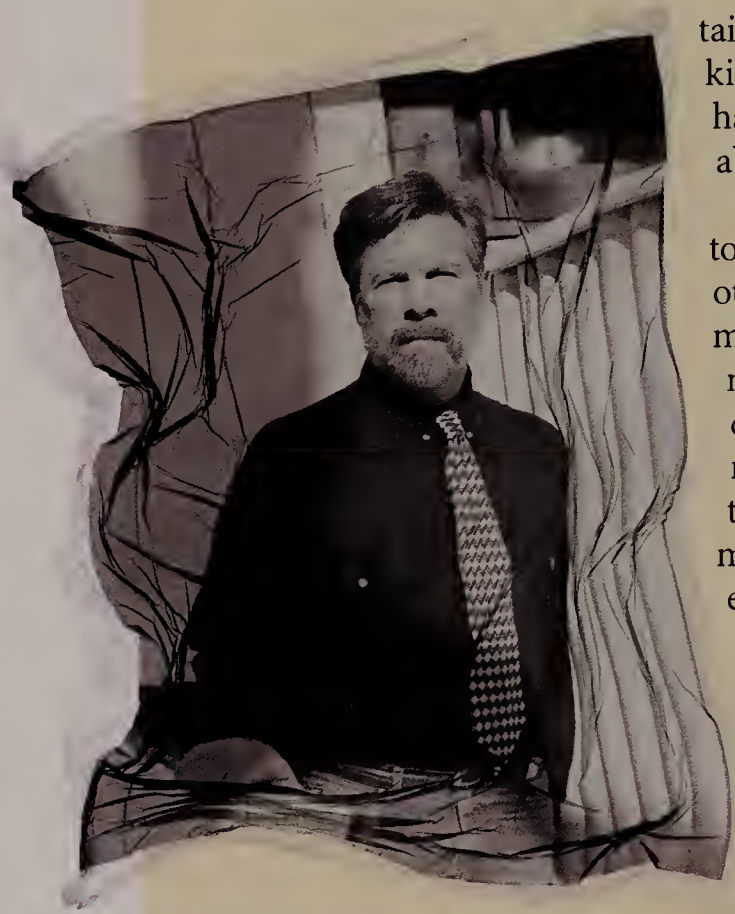
The Virtual Delusion

SELF-DESCRIBED "cognitive dissident" and cyberpundit John Perry Barlow observes one of the not-so-fine distinctions between cyberspace and what he calls "meatspace"—the physical world: "In cyberspace I may get flamed, but I know I won't get shot."

That is, of course, a comforting distinction. Barlow—as someone who, by dint of his strongly held views, has been soundly flamed up and down the Net—knows what he's talking about when he contrasts sticks and stones with words. And he's certainly right that some kinds of mayhem are happily nontransferable.



But it's also useful to remember that in other respects the membrane between meatspace and cyberspace is a little more permeable than many of us might like. For example, if bigots and sociopaths can torch churches and paint swastikas on synagogues, their Web-enabled ilk can do the same sorts of things in cyberspace. Howard Rheingold, author of *The Virtual Community* (and one of the founders of the just-launched cyber-communitarian experiment Electric Minds), notes that it's unreasonable to expect the electronic world to be any more perfectible than the physical world has so far proved to be. Still, all along, one of the more alluring visions of the Net has been fueled by the restless Utopian notion that it represents a clean slate from which certain forms of decay might be excluded.

Its short history has shown, however, that the Net will in due course (no, it hasn't already) become every bit as messy, diverse and ambiguous as the world at large. In fact, in some ways it's a relief to predict this transference and so to anticipate gladly that all vainglorious political misadventures like the Communications Decency Act will be properly thrashed for being not just unconstitutional but against the very laws of nature.

ANYHOW, the unshot Barlow notwithstanding, it is important—perhaps especially important for businesses—to relinquish any virtual delusions that electronic reality is safer than physical reality. A Web site is just another piece of the organizational infrastructure. In addition to the usual positive applications, it can be picketed, infringed, copied, invaded, damaged, spied upon, stolen from, neglected, misused, defamed and mocked.

A recent Web event reinforces this point. The U.S. Department of Justice's Web site got hacked in August (ostensibly as a protest over the CDA and other freedom-limiting measures). Its home page was doctored to feature swastikas, pictures of Adolf Hitler and a variety of lewd images, including one of a topless Jennifer Aniston of TV's *Friends*. The hackers also added links to sites expressing a variety of dissident political views and opposition to the CDA. Hacked HTML has become the equivalent of the graffiti spray can—with the important difference that while graffiti is easy to spot as vandalism, HTML can be indistinguishably and subversively woven into the content of a targeted Web site.

Businesspeople—and especially IS folk accustomed to the logic of systems development—can fall into the cozy trap of regarding the Web as just another wad of interlinked technologies. 'Tain't so, McGee. It's chiefly not technology; it's a place—albeit a place that depends on technology for many of its defining attributes. In the wake of the CDA's passage, Barlow himself penned a cyberspace manifesto. In the name of its free citizenry, he declared "the global social space we are building to be naturally independent of the tyrannies you seek to impose on us.... Governments derive their just powers from the consent of the governed. You have neither solicited nor received ours.... Cyberspace does not lie within your borders. Do not think that

PHOTO BY JERRY MARGOLYCZ

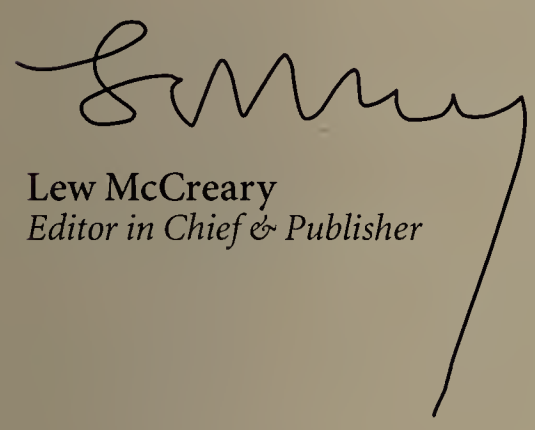
you can build it, as though it were a public construction project. You cannot. It is an act of nature and it grows itself through our collective actions."

Businesses are, of course, a growing part of that natural collective action; the people within those businesses whose job it is to preside over Web strategy-setting and project development will need to

The Net will in due course become every bit as messy, diverse and ambiguous as the world at large.

understand the "placeness" of the Web as intimately as they understand its rich enabling technologies. Otherwise they risk not only failing to recognize the manifest opportunities but also falling prey to any of the numerous emerging perils.

Is there a seminude sitcom star in your Web site's future? Let us know at *mccreary@cio.com.*



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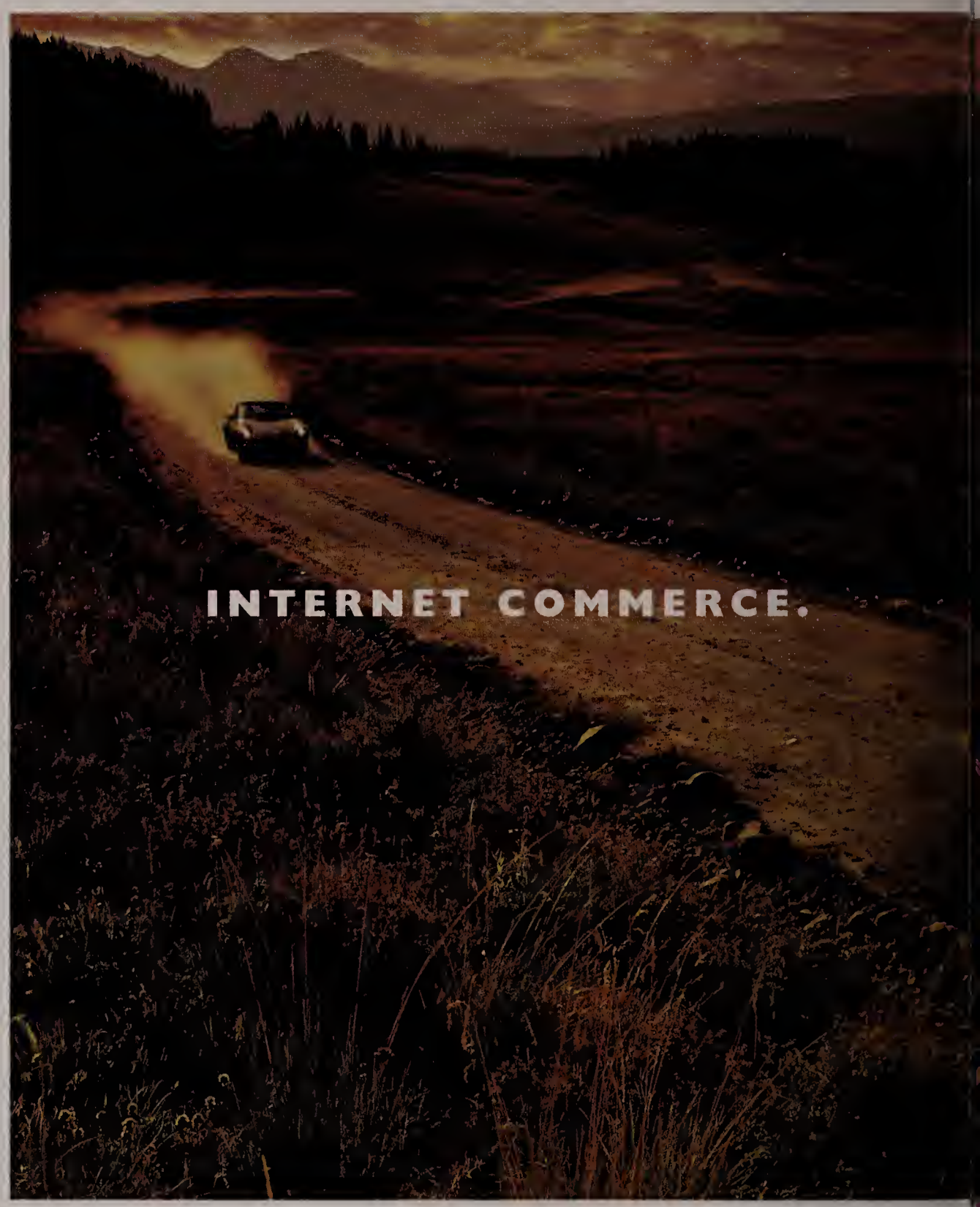

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PROFILE

Value Drivers

THE MASSACHUSETTS Turnpike is no information superhighway, but drivers who go faster than 65 mph will soon be seeing URLs. That's because the state Registry of Motor Vehicles (RMV) plans to include its Web address (*www.state.ma.us/rmv*) on its next batch of speeding tickets, a practical move since Massachusetts drivers can now pay those tickets with Visa or MasterCard over the Internet.

As the first agency of its kind to go transactional on the Web, the RMV has reaped lots of good publicity as well as some rare kind words from its constituents. The agency launched several new services in July—including one that allows drivers to renew registrations online—and residents were there the minute word got out.

"The three network affiliates covered the press conference, and when the evening news was over, we had 49 vehicles registered in the next couple of minutes," says Registrar Jerold A. Gnazzo.

In the next two weeks, the site logged more than 600 transactions, almost 75 percent of them registration renewals. Users can also order duplicate registrations, and the registry expects to sell vanity and specialty license plates online by late fall. Other plans include letting people schedule driving tests, view their own records and perform address changes over the Net.

"We're identifying applications based on what customers request," says Brian Preble, the RMV's webmaster. "Anything that we're doing through the phone center is a candidate for the Internet."

Gnazzo wouldn't estimate how much the Web will save the RMV, although he says he doubts it will reduce head count. But the cost of the system is so minimal—$50,000 out of a $50 million budget—that even a small reduction in the 8.5 million transactions the agency performs each year will probably pay for it. (The site is hosted by the BBN Planet division of BBN Corp. BBN also provides the mechanism for secure transactions, which are processed against the RMV's mainframe database by Electronic Data Systems Corp.)

So far, most of the problems have come from users entering their information incorrectly, says Preble. For example, several people have tried using the Web to pay parking tickets, which the RMV has nothing to do with. Many also don't know their license plate type, but when that happens, agency personnel usually try to fill in the blanks themselves rather than send back an error message. "Even doing it that way takes less time," says Preble. "If you do it over the phone, the customer service person will say, 'Go out to your car, write down the information and then come back and talk to me. I'll hold.'"

ROAD TO SOMEWHERE: Massachusetts RMV webmaster Brian Preble says anything that's done over the telephone is a candidate for the Internet.

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Let My Web Site Go

WEB SITE OWNERS are happy to let you see their pages, as long as you put them back where you found them. That's why many object to caching, a practice that may or may not constitute copyright infringement.

In caching's most basic form, a browser copies a Web page onto a user's hard drive instead of uploading it again when the "back" button is hit. A variation on that, called server caching, occurs when an Internet access provider caches popular sites on its local server rather than making customers go over the Net to fetch them.

While such practices might sound innocuous, "there are all kinds of potential problems," says Edward Cavazos, a lawyer at Houston-based Andrews & Kurth LLP. One concern for site owners is that Web advertising rates are largely dependent on hit counts. If surfers retrieve a locally cached version of a site, that site's server isn't registering those hits. "If you ask site owners about that, they'll say it's a violation of their copyright," Cavazos says.

Prodigy Services Co. (*www.prodigy.com*) is one online service that caches popular Web sites. But Brian Ek, Prodigy's former vice president of government affairs, says aggrieved owners have a solution in technology: As a browser reads a URL, it also reads a line of code that tells it, "Refresh this page if it has been stored in cache for more than X amount of time." Site operators can set the timer for very brief periods, causing browsers to ignore cached copies and download a fresh version from the real Web site.

That will have to do for now because caching isn't going away, according to Ek. "Caching is an essential part of the performance of every access provider... because that's just the way the Web works," he says. Ek also argues that caching may be protected in U.S. law by the doctrine of "implied license"—because every browser and access provider caches, the practice is expected.

Not everyone agrees. The World Intellectual Property Organization has proposed amendments to international copyright language broad enough to consider as infringement a page cached on your hard drive—not to mention a copy written in your computer's RAM. The suggested amendments, which are subject to considerable opposition, are due for a vote next month.

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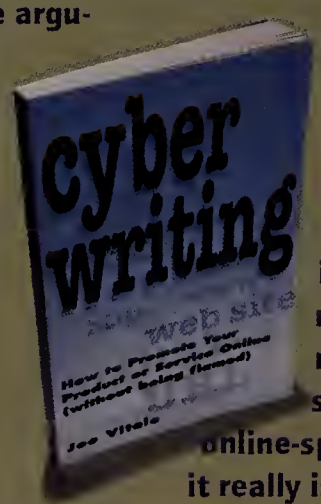
Off the Cybershelf

The premise of Joe Vitale's book *Cyberwriting: How to Promote Your Product or Service Online* (Amacom, 1996) is that new media requires new writing skills. Yet many—perhaps most—of Vitale's suggestions apply equally well to nondigital ad copy: Be specific, get right to the point, use emotional words, target your customers.

That advice may not be new, but it's important. Too many people, in trying to write "differently" for online, throw out everything they've already learned about creating an elegant sentence or framing a persuasive argument. The paramount virtues become brevity, punchiness and interactivity; the prevailing attitude is that online, things don't have to be perfect. Wrong, says Vitale. Because your Internet audience is potentially enormous, "anything you write for the online world needs to be as polished as anything you write for [print] publication."



Useful as such reminders are, one still gets the uncomfortable feeling that Vitale is trying to make this material sound more online-specific than it really is—chiefly by throwing the prefix "cyber" all over the place. For example, the majority of his "Twelve CyberCopywriting Tips" apply equally well to traditional copywriting. Similarly, the advice on how to "Hire the Right CyberCopywriter" works for a print copywriter too, with the exception of finding out whether candidates have experience writing online ads.

There is certainly some information that is online-specific, and much of it is valuable. Still, seasoned writers are likely to feel they've been promised more than is delivered. But that, of course, is the nature of advertising.

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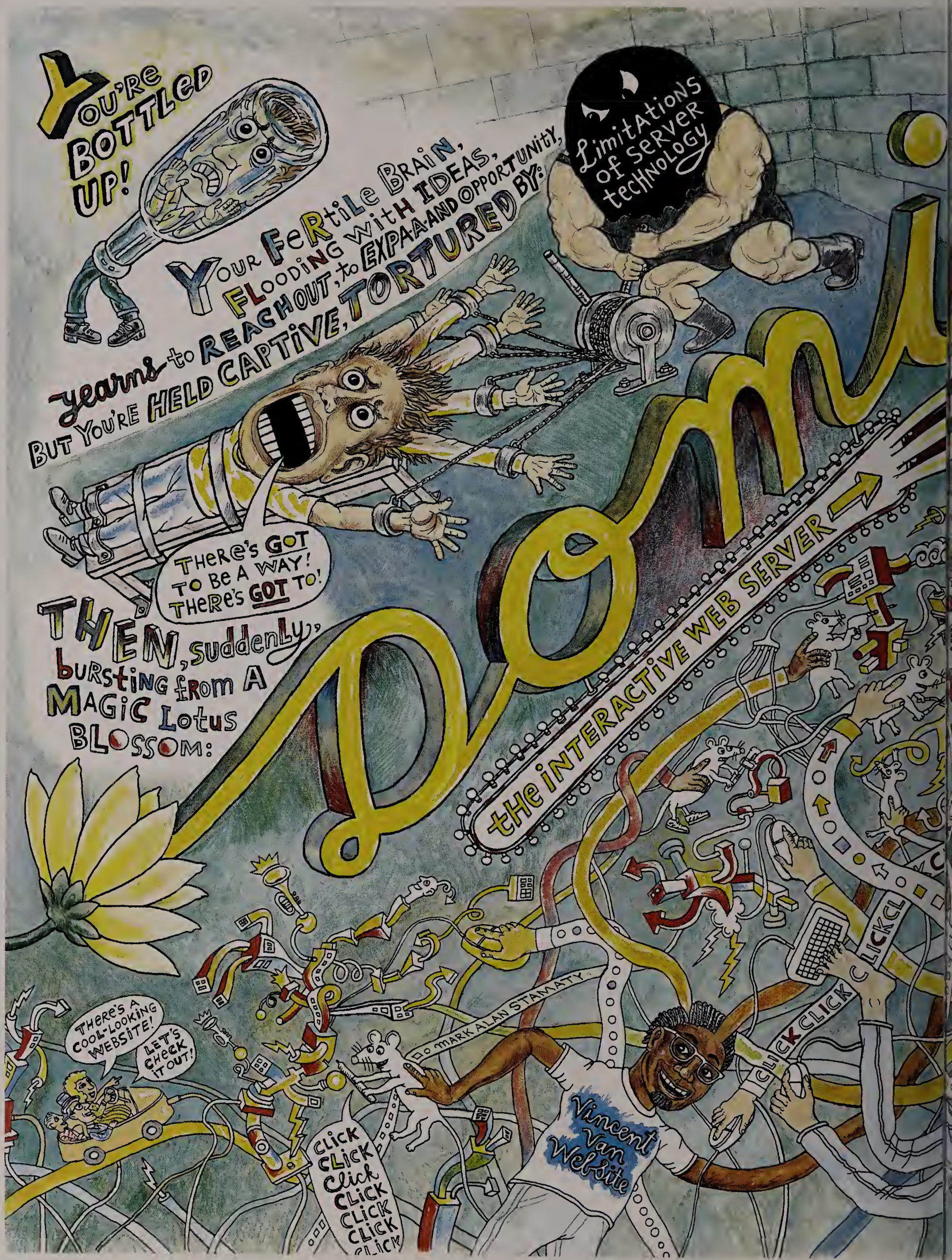
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Search Vengines

SEARCH ENGINES, those Baedekers of the Web, are usually the best way to bring visitors to a Web site. But sometimes they can be the worst way.

That was the lesson learned by Travelocity (*www.travelocity.com*), the comprehensive travel site created by Worldview Systems Corp. and Sabre Interactive. Users looking for the site on such search engines as Yahoo or Infoseek are taken straight to a Travelocity link. But for weeks last summer, surfers who typed "travelocity" on AltaVista were first shown a listing that read, "AVOID TRAVELOCITY!!!"

That link took them to a five-sentence complaint posted by one Richard Julian. Julian placed the notice, he says, because he reserved an airline ticket through Travelocity and learned later that the reservation was never made. And while Julian acknowledges that Travelocity cleared up the problem, he appeared to be in no hurry to remove his warning.

"The whole thing is an unfortunate experience," says Terrell Jones, president of Sabre Interactive and CIO of The Sabre Group. "I think we had resolved it to his satisfaction even before he had posted [the complaint]. But it's a free country. People can put their remarks out there if they want to. What's unusual about the Web is how they can do it with such prominence."

That is pretty much the sentiment at AltaVista, which, like other big search engines, doesn't even try to separate the cranks from the ranks. "We can't get into that," says Dilip Phadke, director of marketing at Digital Equipment Corp.'s Internet software business unit. "We are not performing an editorial service."

Phadke says AltaVista has removed links to certain sites but only at the request of those sites' webmasters. In a recent case, for example, a site owner asked Digital to remove a link because he feared that AltaVista's pointing to his page could increase his risk of being sued for libel. But generally, says Phadke, AltaVista's policy is "live and let live."

"It's the spirit of the Internet," Phadke says. "It's like Hyde Park in London, only it's a '90s version of Hyde Park. And assuming the complaint is valid, it can be a way of improving customer service. Of course, wouldn't it be nice if the same person posted another notice saying, 'I'm happy now'?"

Julian may never be happy, but he appears to have at least been satisfied. At the end of September, his complaint was removed.

PHOTO BY FURNALD / GRAY / ILLUSTRATION BY LISA BLACKSHEAR

Yes, We Have No Pans

Spiders can be awfully literal, as the above item shows. And it doesn't take a deliberate act of mischief to throw them off the track. Just ask the folks at Web-development firm Tonabricks (*www.tonabricks.com*), whose home page for a cookware company attracted numerous visitors wanting to buy stainless steel sauce pans and aluminum pasta cookers. Trouble was, the company didn't exist: It was concocted out of whole cloth by Tonabricks for the sole purpose of demonstrating the quality of its work.

The design company had dutifully explained on its referrer page that the company—Panarama—was fictitious. Unfortunately, search engines are generally not in the business of supplying context. "If a search engine is asked to find a page that sells nonstick pan sets at discount prices over the Internet and allows payment with a Visa card, the Panarama sample page—without the Tonabricks Web design page introduction—looks like a perfect hit," says John Weaver, Tonabricks managing designer and owner. For the user, the experience is like wandering onto a movie set and not seeing the cameras. And it stands as a warning for site owners who assume that surfers will arrive at their information via a prescribed path.

As for Tonabricks, it is addressing the problem by adding disclaimers at the top of each page. That way, even if Web users land in Panarama by mistake they won't waste time trying to shop there.

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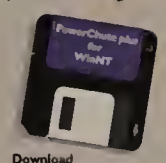

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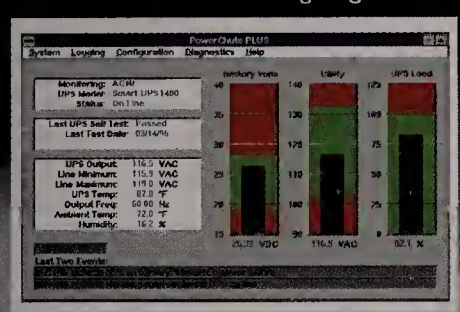

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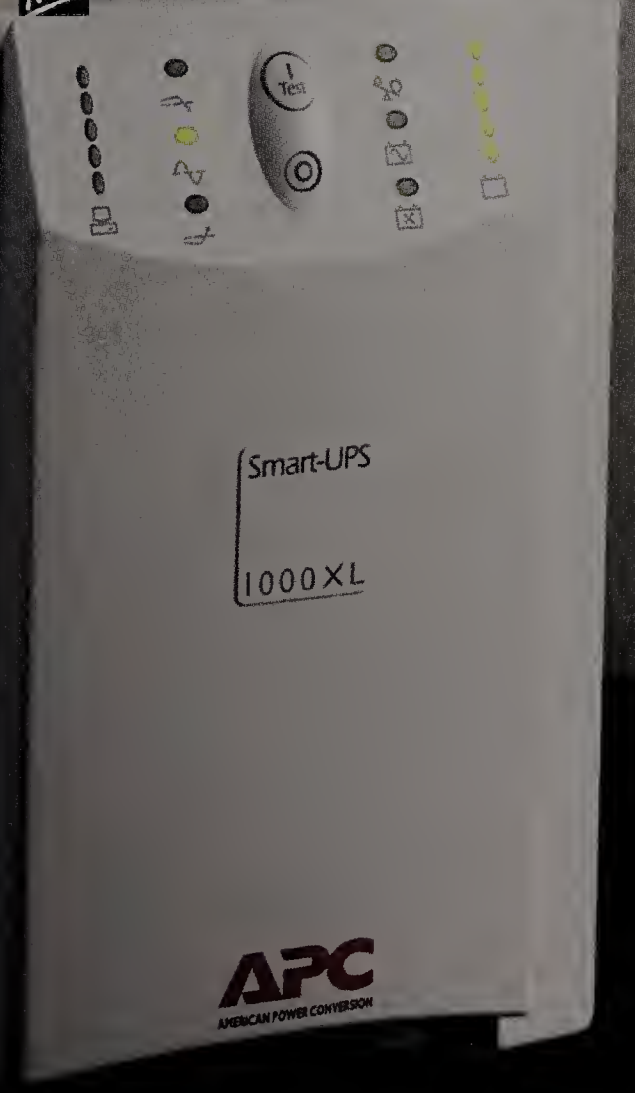

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Price As You Go

THE WORD "flexibility" gets a lot of wear and tear these days. But the ability to be flexible on price is an undeniable business advantage, one that is increasingly being pursued on the Web.

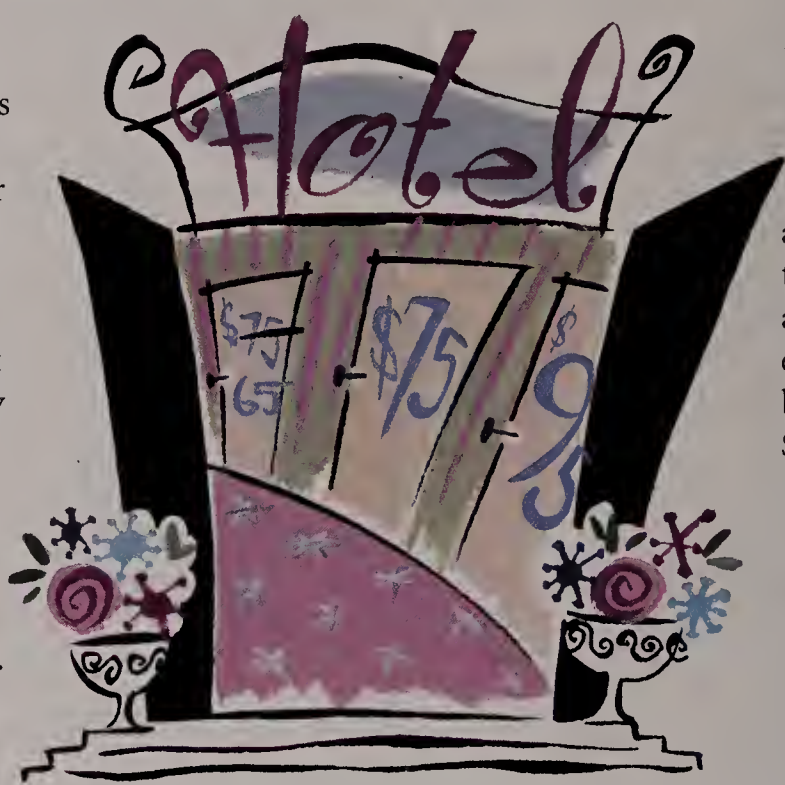
The best-known practitioners of Net-based dynamic pricing are the airlines, which use e-mail auctions to unload seats that would otherwise go begging. A similar model can be found at the hotel reservation service Places to Stay (*www.placestostay.com*). Using Bluestone Inc.'s Sapphire/Web tool, the company allows participating hotels to easily change their own on-site information. One of the things they change most frequently is price.

"Say it's Wednesday, and The Fairmont Hotel has every room booked for this weekend," says Andy Chan, Places to Stay's vice president of marketing. "Then a group cancels and 50 rooms become available. So the Fairmont puts up a special marketing message, offering 50 rooms at half price."

The company also encourages hotels to experiment with pricing—for example, quickly raising rates by $10 if a promotion proves popular and bringing them back down if the increase turns people away. And it is working on a way to enable hotels operating below capacity to automatically e-mail discount offers to self-selected guests.

Another variation on dynamic pricing is practiced by FastParts Trading Exchange(*www.fastparts.com*), a sort of online stock market for original equipment manufacturers, contract assemblers and suppliers dealing in circuit board parts. Prices are fixed entirely by supply and demand; much of the merchandise offered is surplus and therefore heavily discounted.

"Say a contract assembler's customer wanted 20,000 pieces of 40 different chips," says Gerry Haller, FastParts Inc.'s founder and president. "Then the customer calls and says, 'Instead of 20,000 boards, I need 10,000. Get rid of the other parts.'"



So the contract assembler posts a "sell lot" on FastParts for 10,000 parts at $2 each. If a buyer says he needs that part but will pay only $1.90, FastParts responds by posting a "buy lot," using the original sell lot as a template but changing the price to $1.90. When that happens, all sellers with the same part are alerted via e-mail that a buyer is offering $1.90. Say one of them drops the price to $1.95. The buyer comes up five cents; the system recognizes a match and forms a trade transaction. "If you are knowledgeable about the marketplace, you can see immediately all the positions and change your pricing accordingly," says Haller.

Deal. WM

ILLUSTRATIONS BY ROBIN ZINGONE

Patent Offenses

The Internet is a fabulous incubator for new concepts, as long as nobody steals your eggs.

Jeffrey Lewis, a partner at Patterson, Belknap, Webb & Tyler LLP in New York, says online idea banks, including technically oriented Usenet newsgroups, can be a hotbed for competition as well as collaboration. "The problem is that many of these user networks are people in the same field working in different companies," Lewis says. "You have to tell your in-house employees to be careful not to post everything to the Internet."

Another concern is that U.S. law dictates that once you have gone public with an invention, you have only one year to file for a patent, after which time your brainchild winds up in the public domain. Talking about your idea on the Web, even in the context of asking for feedback or advice, sets that clock ticking.

While that one-year deadline forces companies to use or lose, it also affords them at least temporary protection against competitors beating them to the punch. But other countries lack such a grace period, meaning someone in Botswana who reads about your musical corkscrew on the Net can patent it himself.

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Match Point

VENDORS WERE WASTING MONEY; BUYERS WERE WASTING TIME. ONE WEB SITE SOLVED BOTH PROBLEMS.

A COUPLE OF YEARS AGO, veteran software and database industry executive Reed D. Taussig spotted two disturbing trends: Software vendors were spending more and more money on marketing, and software users were spending more and more time figuring out which products to buy.

Taussig and Bruce Scott, then senior vice presidents at Gupta Corp. (now Centura Software Corp.), saw a way to cure two ailments with a single remedy. Taussig sums it up this way: "We decided there was a need for a place on the Net where we could provide information for users and provide vendors with qualified sales leads."

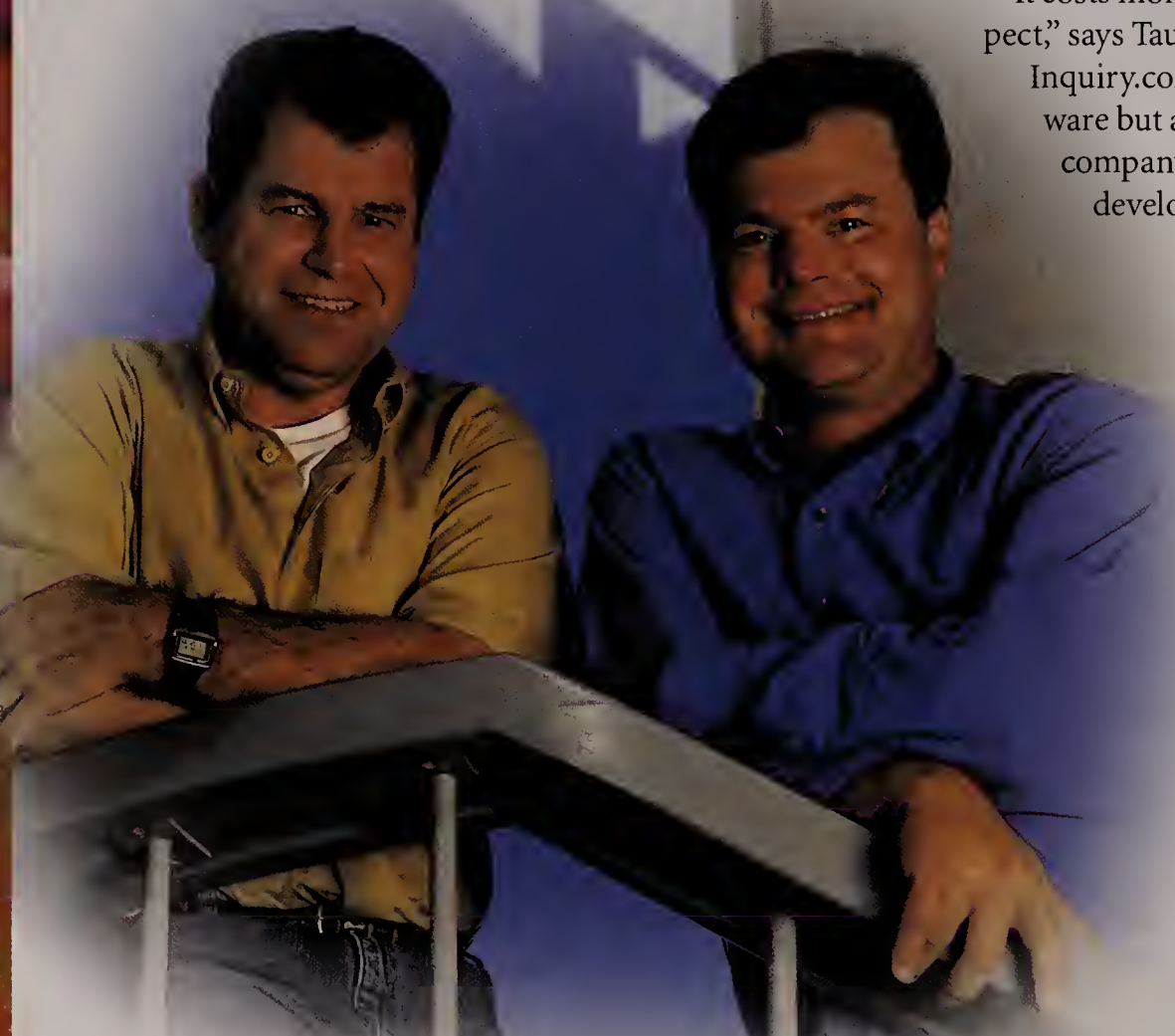
Thus was conceived Inquiry.com (*www.inquiry.com*), a one-stop smorgasbord of free resources for IT professionals and a source of highly targeted prospects for vendors. Taussig and Scott knew what their audience wanted: to save time. IT managers considering software, hardware or networking investments typically spend much of their workdays scanning relevant publications, reading reviews, consulting their peers, calling vendors for brochures and demonstrations and, increasingly, surfing the Web. By focusing the research process, Inquiry.com aimed to cut dramatically the time needed to find specific material.

To bring Inquiry.com to life, Taussig and Scott—Inquiry.com Inc.'s president and CEO and vice president of engineering, respectively—persuaded venture capital companies Crosspoint Venture Partners and Burr, Egan, Deleage & Co. to bet $750,000 apiece on the project in June 1995. A year later, Softbank Holdings Inc., parent of computer magazine publisher Ziff-Davis Publishing Co. and a major Yahoo Corp. investor, added $3 million to the pot. Crosspoint and Burr, Egan, Deleage each invested an additional $1 million.

"It costs more money to do than you would ever expect," says Taussig, citing not just the $1.4 million that Inquiry.com spent developing its proprietary software but also the $150,000 that the 35-person company burns through every month to further develop the site.

What they got for that money is a well-designed site that matches people who have software and networking needs with people who have software and networking solutions. And while the site accepts no advertising, every vendor offering a solution pays $5,000 a year. For that price, vendors are listed in the site's product directory and are allowed to participate in forums and to make literature accessible through the site's search engine.

THE SAN MATEO, CALIF.-based company features a searchable directory of software and networking products, vendors, value-added resellers and con-



INQUIRING MINDS: Bruce Scott, left, and Reed Taussig created Inquiry.com to match companies with software and networking needs with others offering software and networking solutions.

PHOTO BY CINDY CHARLES

sultants. Using the site's client/server application, which is powered by an Oracle Corp. database, visitors can search for information by category, feature, product title or company name.

And Inquiry.com's database provides free access to some 130,000 full-text articles, reviews and news from about two dozen publications, such as *Communications Week*, *Home PC*, *Interactive Age*, *InfoWorld* and *Windows Magazine*. Technology tips, vendor literature and the popular *DBMS Magazine Buyer's Guide* are also online. Initially, Inquiry.com paid for this material, but as the site grew and publications started to earn subscription revenues from the exposure, Taussig was able to negotiate no-fee barter arrangements. These days, the magazines are pleased by the new subscribers, and Inquiry.com benefits from the more objective perspective provided by information that isn't paid for by vendors.

In the first eight months of 1996, Inquiry.com attracted more than 400,000 users who downloaded 3.8 million pages and generated 4,000 sales leads.

When visitors enter a search query on, say, Java tools, the site's proprietary technology returns a list of references, ranked in order of relevance. Clicking on one brings up the full-text article, including a section with links to vendor information, such as brochures, white papers, data sheets, demonstrations, seminar schedules and conferences.

Can't users find the same information with general Web search tools such as AltaVista or from news sites such as Individual Inc.'s NewsPage? Some, but not all of it. And they'd usually get pages and pages of unrelated material as well.

At Inquiry.com, users get exactly what they need and thus eliminate the blizzard of false leads. They also have free access to an online community of IT professionals through forums on topics ranging from Web database publishing to industry gossip. The forums, Taussig says, are monitored to make sure that no single vendor monopolizes the discussion. In mid-1996, the online conferences were attracting about 500 people a day. (Of course, not all posted messages.)

If the forums don't provide the needed information, industry experts hired by Inquiry.com will. The site connects visitors with technology book authors, engineers and consultants who will answer questions about C++, Java, Virtual Reality Modeling Language and other languages and technologies—online and at no charge. Naturally, visitors might also hear from 120 participating vendors, including Microsoft Corp., Oracle Corp., Spider Technologies Inc., Informix Software Inc., Illustra Information Technologies Inc. and Progress Software Corp. But, Taussig says, that will happen *only* if a visitor requests the contact by clicking on options such as "Sign Up for a Seminar" or "Have a Sales Rep Call Me." At that point, Inquiry.com alerts visitors that their user profiles are about to be sent to the vendor for possible follow-up contact, giving them one last chance to accept or decline.

In addition to the annual $5,000 membership fee, vendors pay $25 for each visitor who pushes the "accept" button. Taussig calls the per-name price a bargain. And it is, especially when compared with Inquiry.com's main competition: direct mail, which typically gets a 1 to 2 percent response. Direct mail costs about $1 per solicitation or, at a 2 percent response rate, $50 per name—not including the cost of follow-up phone calls or mailed information packets. In the first eight months of this year, Inquiry.com attracted more than 400,000 users, who downloaded 3.8 million pages of information. Those visitors, in turn, generated more than 4,000 sales leads.

While anyone can use the site, Inquiry.com—linked from about 700 other sites—appears to be attracting its intended audience. About 20 percent of visitors who choose to register are senior IT executives; about 30 percent are IT managers, webmasters or Web developers. Another 25 percent are consultants and associations, while application developers, editors and "others with interest" account for the rest. Fully a third say they visit at least twice a week; 80 percent use the service twice a month.

Taussig is pleased with the company's progress so far. And his investors should be pleased as well. Inquiry.com, Taussig says, is expected to turn a profit early next year, less than two years out of the gate. WM

Senior Editor Anne Stuart can be reached via e-mail at astuart@cio.com.

www.inquiry.com

BILLIONS OF DOLLARS IN INTERNET COMMERCE ARE WAITING FOR A MICROPAYMENT SYSTEM THAT PAYS OFF **BY FRED HAPGOOD**

Pennywise

For years, commentators on Internet commerce have ranked micropayments—online payments of a dime or less—as a key catalyst for the medium, up there with tighter security, simpler access procedures and consumer education.

Micropayments, the argument went, would allow vendors to creep under the famous price sensitivity of Internet users by setting prices "too low to matter." Once prices fell below that threshold, sheer volume would compensate for the low unit prices. From a user's point of view, the new financial structure would inspire the development of services—custom newsfeeds, processing applets, data queries—that are financially impractical using current mechanisms.

The market logic seemed impeccable. But it is five years since Internet commerce began and three since the explosion of the Web, and micropayments are still more rhetorical than real. Some experts believe they might still be years away. "In my opinion, the viability of cheap Internet transactions is still a wide-open question," says Carnegie Mellon University Professor Marvin Sirbu, chairman of the university's Information Networking Institute, which is researching a micropayments protocol called NetBill.

Micropayment systems can be divided into debit/credit (pay earlier/pay later) and digital cash (pay now). The NetBill system is an example of the former. Both buyers and sellers must have arranged accounts with a NetBill licensee, perhaps a financial services company, prior to the transaction. When Alice hits a "buy" link on a file carried on Bob's Web site, Bob's server delivers it in encrypted form, unreadable by her. A record of the transaction is sent to the NetBill server maintained by the licensee, which then checks Alice's balance. Meanwhile, a NetBill client running on Alice's desktop probes the integrity of Bob's transmission by matching what was sent against what was received. If both halves of the transaction check out, the NetBill server sends the decryption key to Alice while debiting her account and crediting Bob's.

NetBill hopes to pay for all costs—storage, processing, bandwidth and management (including marketing, security, accounting and software maintenance)—out of a gross return of one to two cents per transaction plus a small percentage of the transaction value. Sirbu says that while research suggests that many of these costs can be reduced significantly, customer and technical support costs remain a looming unknown. New products naturally generate support calls, and users with money at stake are especially demanding.

But pennies a transaction doesn't buy much of a service bureau. "If your support lines cost out at $5 a call," Sirbu says, "and you're getting one cent a transaction, one call wipes out the gross of 500 transactions." (Not to mention the net.) Sirbu suspects that the prospects for any micropayment protocol will be measured by its success at automating customer support, in addition to providing security, reliability, quick response time and ease of use.

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THE COSTS OF CUSTOMER support are not the only market inhibitor. Bill Densmore, chairman of Clickshare Corp., which markets a micropayments system with the same name, says his system has been delayed in part by resistance from one of its target markets: newspaper publishers.

Clickshare differs from NetBill in that it envisions four interacting parties instead of three: the buyer, the seller or publisher, the buyer's "home base" (which might be an Internet access provider), and an account manager, which could be Clickshare itself or a licensee.

Under this model, if Alice wants to buy a file from Bob for 10 cents, she first logs onto her home base, which attaches an identifying token to her URL. Next, she clicks on the link to Bob's site, which is hosted by the home base, and then, when "inside" Bob's site, she clicks on the desired file. Bob's server authenticates Alice's home base token, delivers the file and sends copies of the transaction to both the home base and the account manager. Alice's home base bills her for a dime; the account manager bills the home base for seven cents; and Bob bills the account manager for a nickel. The account manager is responsible for sending complete transaction records to users at specified periods.

"The marketplace was not nearly as ready to go as people thought a year ago," Densmore says. "Publishers have never operated in a world in which articles are bought on a per-item basis. The idea was alien to them." He adds that newspaper management historically has depended on the model of aggregated content. Micropayments empower individual reporters and writers against the collective effort, and that runs hard against the grain.

Finally, many publishers have hoped that their online efforts could be supported with paid advertising, a more conventional support relationship. Densmore says that confidence in advertising revenues is fading and that he expects to start a full trial of the Clickshare micropayments system with *The Christian Science Monitor* before the first quarter of 1997. However, according to David Creagh, the *Monitor*'s electronic publishing manager, what the *Monitor* likes in Clickshare is not the payment options but rather the sophisticated monitoring functions. "Our advertisers like to know how many times the same person comes back to a page," he says. "The Clickshare technology is the best we've seen for finding such information."

The only micropayments system now signing up customers is also the only electronic cash system: DigiCash BV's Ecash. Electronic cash is more complicated to design but cheaper to maintain than the credit/debit model because accounting and auditing expenses are reduced. (DigiCash claims transaction costs in the region of a penny each.)

Under this model, if Alice wants to buy from Bob, she sends him 10 cents worth of electronic currency purchased previously from a participating bank. Bob can deposit the currency or spend it in turn as he pleases. This decentralized transaction model has the virtue of making it harder for an authority to accumulate a master list of all the transactions conducted by a single buyer.

In October 1995, Mark Twain Bank started selling electronic currency to online customers. Frank O. Trotter, senior vice president at Mark Twain and director of its International Markets Division, says that as of July 1996 about 1,000 buyers and 250 sellers were participating in the program. (Representative sellers included CD distributors and software manufacturers.) He says he expects deals currently under discussion to push the number of participating buyers to about 10,000 by year's end, adding that the cost of customer support has not been a problem so far.

Certainly the Ecash experiment is worth tracking, but one bank, 250 sellers and a thousand buyers after three quarters of operation is more than a shade shy of your usual Net takeoff trajectory. Jim Kwock, director of online transaction services at AT&T EasyCommerce Services, says that the small scale of the amounts involved means that all the costs of adopting and maintaining the technology must be kept as low as possible. Micropayments have to be transparent, serviceable, trusted and simple—and seen to be such—not just for buyers but for sellers, account managers and financial institutions as well.

Kwock suggests that the future of micropayments may lie with providers large enough to amortize development, security, management, consumer education and support costs over a very large user base. AT&T Corp. is, of course, an example of such a provider, and Kwock adds that phone companies have a long history of success in selling and billing in units that are very small, though not quite in the league of microtransactions.

However, he has no announcements to make at this time. WM

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AT&T EasyCommerce Services
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The Christian Science Monitor
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Clickshare Corp.
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DigiCash BV
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Mark Twain Bank
www.marktwain.com

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Fred Hapgood is a Boston-based technology writer. He can be reached at fhapgood@pobox.com.

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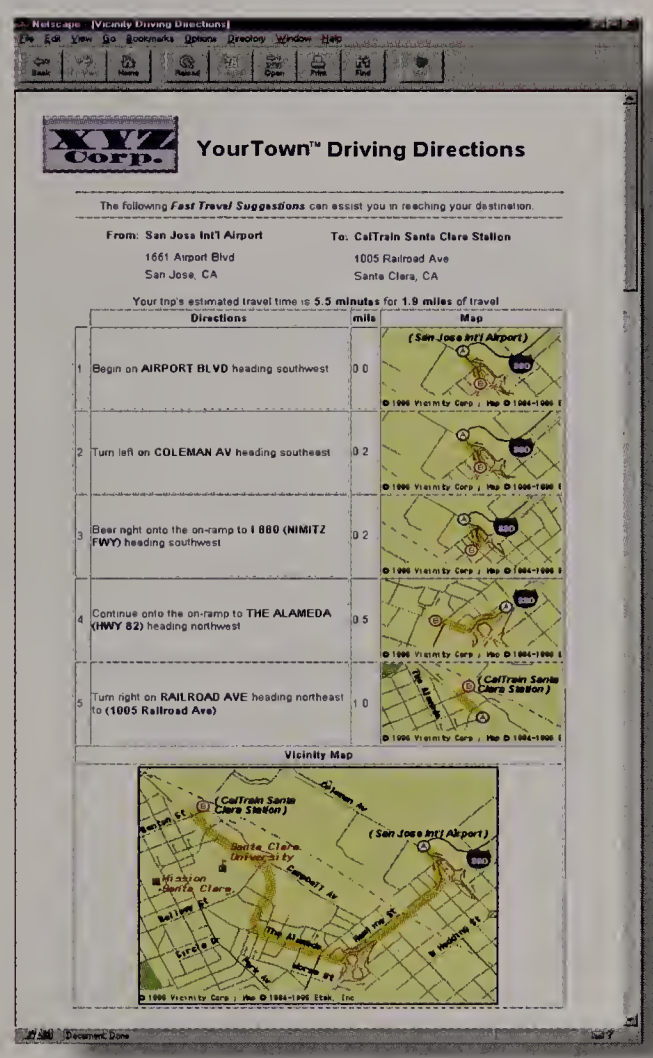

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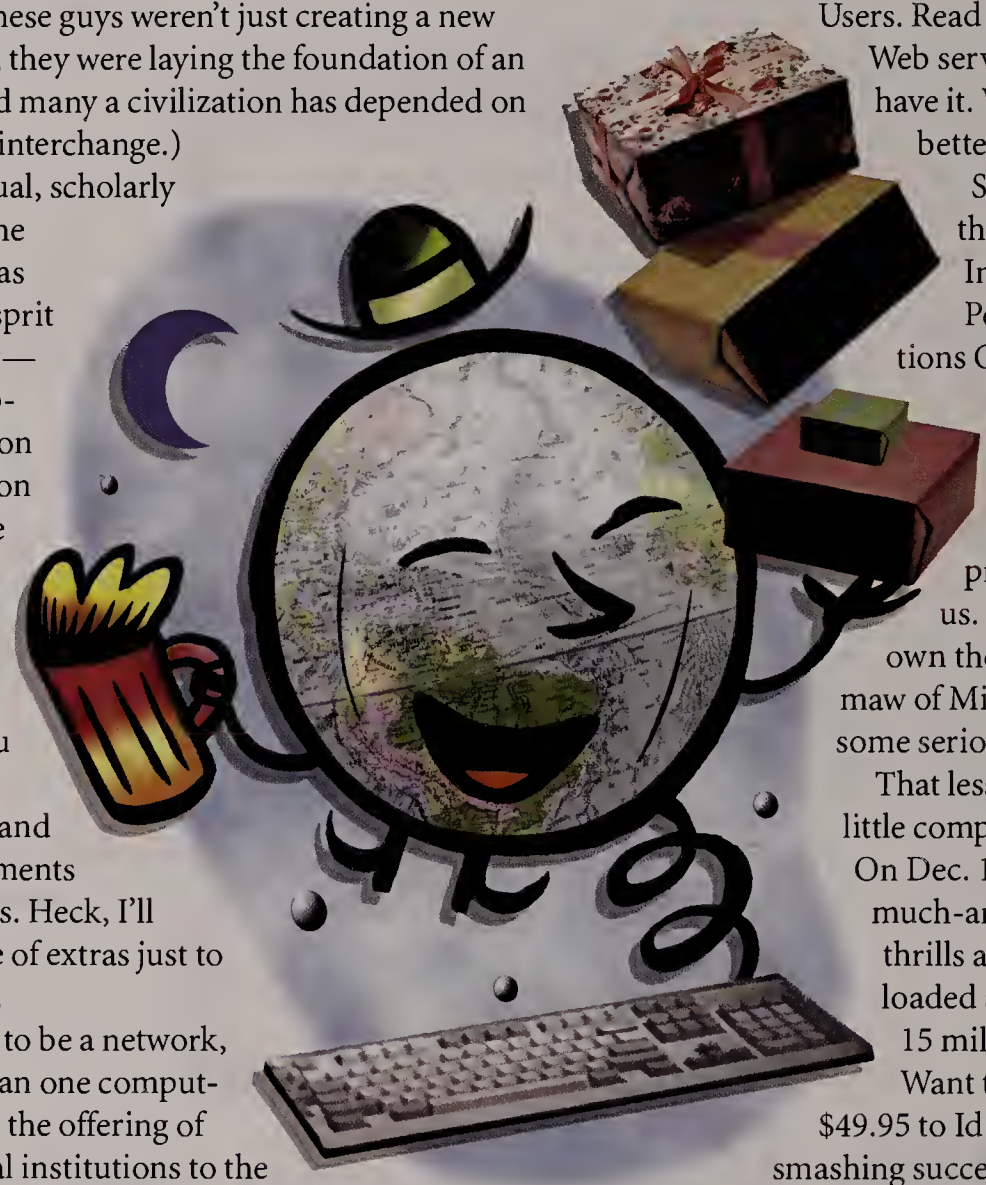
ADV 1016/10.96

Better to Give

ON THE INTERNET IT'S THE GIFT THAT COUNTS **BY JIM STERNE**

In its infancy, the Internet was just a gaggle of guys working on an experiment. There was some Department of Defense funding. There was some imaginative foresight. There was some never-before-considered technology. There was some beer. (Lest we discount the value of the beer, remember that these guys weren't just creating a new technological wonder; they were laying the foundation of an electronic culture. And many a civilization has depended on beer to smooth social interchange.)

Due to the intellectual, scholarly nature of these men, the culture they created was one of camaraderie, esprit de corps and intimacy—all in the spirit of cooperation. Facing common problems and relying on the expertise of people they seldom talked to and never met, they established a digital ecosystem based on respect and honor. You respect my needs and answer my questions, and I'll honor my commitments and meet my deadlines. Heck, I'll even throw in a couple of extras just to show off my expertise.



Of course, for there to be a network, there must be more than one computer, so the first step was the offering of hardware by individual institutions to the multitude. Step two was software. Team members would create code and make it available to everyone to review, test, comment on and improve. Finally, the protocols had to be defined and codified. That wasn't a formal committee sort of thing. In Web pioneer Vinton Cerf's own words:

"In April 1969, Steve [Crocker] issued the very first Request For Comment. He observed that we were just graduate students at the time and so had no authority. So we had to find a way to document what we were doing without acting like we were imposing anything on anyone. He came up with the RFC methodology to say, 'Please comment on this, and tell us what you think.'" (See *www.isoc.org/guest/zakon/Internet/History/How_the_Internet_came_to_Be*).

It was the need to work together, technically and politically, that mothered the Gift Culture. Dip into this database of meeting minutes of the Advisory Committee of CERN Users. Read how to establish your own Web server. It's free. We want you to have it. We want to make the Internet a better place for everybody.

So what does that mean to those who would use the Internet for marketing? Plenty. Perhaps Netscape Communications Corp. will hold onto the record for the largest initial public offering in history. Approaching the $3 billion valuation mark in August 1995, it provided a lesson for the rest of us. Give it away; set the standard; own the market. Even the mighty maw of Microsoft Corp. has had to play some serious catch-up.

That lesson was offered up earlier by a little company called Id Software Inc. On Dec. 10, 1993, Id released its much-anticipated game Doom. 3-D thrills and bloody spills were downloaded and floppy-swapped by some 15 million gamers. It was free. Want to get to level two? Just send $49.95 to Id Software. Software heroin. A smashing success.

Baby, You Can Drive My Car

In 1992, Digital Equipment Corp., that darling of the minicomputer era, misstarter in the Unix workstation era and also-ran of the PC era, came up with a new machine called the Alpha. It wanted people to try it out. It offered a test drive.

For several years, you could take Telnet to one of Digital's fastest, hottest new megaprocessors and check it out. Even better, you could upload your own software, test it for compatibility and benchmark it for performance. Digital was putting itself on the line by putting its newest technology online. It stepped up to the plate and said, "Come one, come

ILLUSTRATION BY PAMELA HOBBS

The Internet is now safe for more than window-shopping.

Working with EDS, First Virtual is making the Internet a safe place to use a credit card.

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all." It was a bit revolutionary.

Log on anonymously to a brand-new computer and run your own software? A company that invited you into the control room and handed you the keys? Ballsy. And effective.

Unfortunately, the Internet got a little too popular for Uncle Sam's comfort. On Nov. 1, 1995, Digital pulled the plug. "Due to world trade agreements and U.S. Department of Commerce concerns, Digital cannot openly supply the latest technology available," the company announced on its Web site (*www.digital.com/info/alpha-demo.html*). But Digital didn't give up and didn't lie down. On Dec. 15, 1995, it introduced a service instead.

The AltaVista search engine is a database of all the Web sites its spider can find, coupled with an index and a query tool. Did we really need another Web site to help us find Web sites? What could Digital offer that would make a difference? Why should AltaVista be getting more than 17 million hits per day? And if it's that popular, why isn't Digital selling banner space?

Because AltaVista is a gift. It's Digital's way of giving back to the Net. In the spirit of that first gaggle of guys trying to make this gizmo work, Digital has created a search tool for the masses. It is giving freely of its development time, its hardware and its customer service department to make the world a better place.

And the Tooth Fairy and Santa Claus are buying me a winning lottery ticket this afternoon.

Digital isn't selling ad space, because AltaVista is *itself* an ad. It's an ad for Alpha computers, and it's a doozy. If you're looking for something out there on the Web, AltaVista is a fast way to find it. Very fast. Of course, running your query engine in 6GB of RAM across 10 processors is a great way to expedite a search, and that's just one of five systems behind AltaVista. But as always with advertising, it's the perception that counts:

"Jeepers, Clem, that li'l ol' Alpha sure do put on some speed."

"Yup, I reckon we oughta get us one o' them for the dynamic multidimensional analysis of our consolidated enterprise data."

"Reckon so."

Is this a successful marketing model for the Alpha? It certainly hasn't hurt. In Digital's third quarter of fiscal 1996, big Alpha systems sales were up 60 percent. And the company has moved into a whole new product line: Digital now has an AltaVista Internet software products division. Under the vision banner of "OnSite Computing," Digital is offering AltaVista Search, AltaVista Mail, AltaVista Forum for conferencing, AltaVista Manager for applications and network connections inventory, AltaVista Firewall and AltaVista Tunnel security tools.

That is not to say that Digital wouldn't have gone into these businesses anyway, but with AltaVista it discovered something that Sun Microsystems Inc. had already learned: Sometimes the child outshines the parent. Scott McNealy, after finishing his usual round of Microsoft-bashing at Comdex/Spring '96, said that within a year Java had become a bigger brand name than Sun. Digital saw the writing on the wall and named its Internet software products division after something that had garnered significant, positive attention out on the Net. Smart move.

AltaVista often shows up on lists of surfers' favorite search tools. It's so popular that Yahoo Corp. forsook its own minority investor, Open Text, for AltaVista. And yes, I use it myself, all the time. It's fast. It's easy. It has no commercials!

With AltaVista, Digital discovered something that Sun Microsystems had already learned: Sometimes the child outshines the parent.

Give Until It Stops Hurting

So what have you got that might be of interest to the Internet at large? What software might you give away for free or service might you offer gratis? What back-room development project might be brought out into the light, have its name changed from Oak to Java and be dressed up for the ball? What new product line are you launching that could use a boost from a precursory foray into the land of the free and the home of the brave?

Dig deep and give. Give until people perceive you as engaging in a Net-centric act of selflessness. Then sell 'em the movie rights, the T-shirts, the action figures and the baseball caps. They'll buy. And you will have done something positive for the Internet.

In the meantime, don't discount the importance of beer to the wired population. Last time I looked, AltaVista had put the Web and newsgroup count for "beer" at 461,934, and there are about 120,000 documents containing the word "beer." Make that 120,001.

If you can find a way to give away beer on the Internet, the world will beat a path to your server. WM

Jim Sterne (jsterne@targeting.com), *president of Target Marketing of Santa Barbara, is an Internet marketing strategy consultant and the author of* World Wide Web Marketing *and* Customer Service on the Internet.

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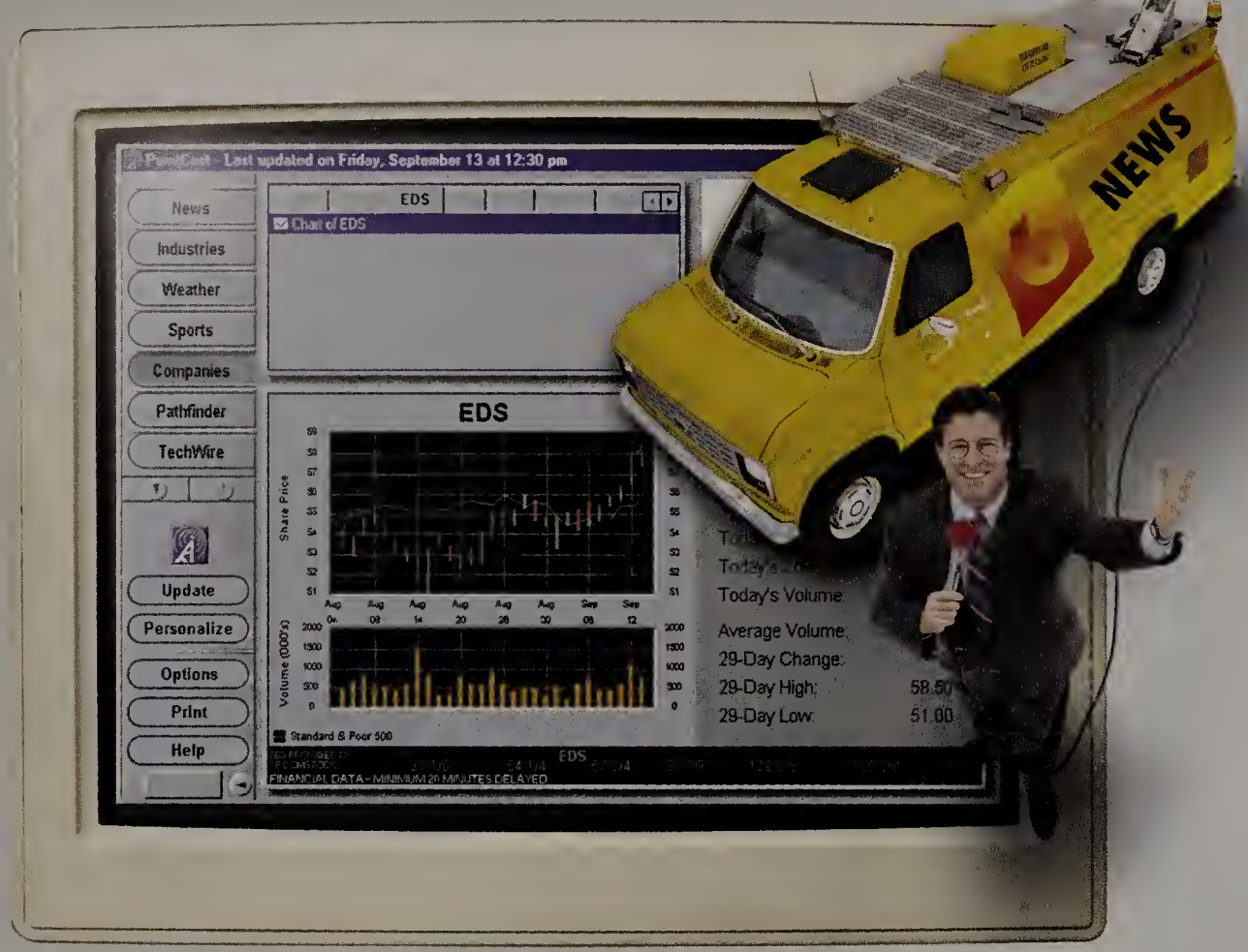

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EDS provided insight and technical expertise to help design critical software such as proxy servers and firewalls. Allowing PointCast to enter the marketplace smoothly and, even more important, reliably.

PointCast was launched in May 1996. Currently, over 1.5 million registered viewers receive an uninterrupted, customized flow of up-to-the-minute information. A most newsworthy accomplishment, indeed.

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Sizzle and Steak

Multimedia morphs from a pointless frill into a serious business tool

By Lynda Radosevich

ILLUSTRATIONS BY ROBERT ATKINSON

IT'S JUST ANOTHER day at the office. You walk into a conference room, feeling a bit sheepish because everyone else is there before you. There's a whiteboard and some artwork on the wall, a speakerphone on the table, nubby blue carpeting underfoot. After dispensing with pleasantries, you start your presentation. You display a snazzy computer-aided design (CAD) drawing of Product X. You run a quick slide show outlining the marketing strategy. You tack up a spreadsheet demonstrating how Product X will make big bucks for the company. The CFO, skeptical as always, changes numbers in the cost fields, but the profit line still slants sharply up. The president is so impressed that his head spins around three times.

See, the president isn't really the president. He's an "avatar"—a digital representation of himself. In fact, every "person" in the room is an avatar. The conference room itself is digital, rendered in three dimensions. The phone isn't a real phone, although it transmits real voices. And the whiteboard is virtual too, but it has the ability to link via Microsoft Corp.'s OLE to objects on your computer such as CAD drawings and spreadsheets.

The real people are sitting on scratchy, pneumatically-adjustable chairs in front of their computer screens in Dallas or Bonn or Kuala Lumpur. All the action is taking place on the World Wide Web.

All this is entirely feasible today. Design company Planet 9 Studios Inc., for example, is building digital rooms similar to the one described above using Autodesk Inc.'s AutoCAD and 3D Studio. The prototypes work with Virtual Reality Modeling Language (VRML)-enabled browsers such as Black Sun Interactive Inc.'s CyberGate. At press time, Planet 9 had no firm customers for its conference tools but was negotiating with resellers.

But Planet 9 does have takers for another of its business-oriented applications: virtual trade shows.

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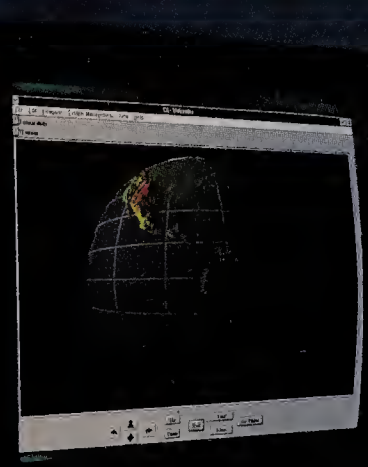

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Such applications demonstrate how multimedia—typically associated with massacre games and bandwidth-hogging promotional sites—can be put to work by real businesses for real business purposes. "Multimedia on the Internet is very important right now," says Richard Shaffer, principal at consulting firm Technologic Partners. Shaffer gives an example in which customers of a manufacturing company log onto the supplier's Web site, download the electronic equivalents of parts and drop them into CAD programs. Similarly, some companies are posting multimedia versions of their products on the Web for testing and manipulation by engineering teams and end customers. For example, as proof of concept for electronic prototyping for the Web, Altia Inc. has created a prototype of customer Eastman Kodak Co.'s Advanced Photo System Advantix camera, which users can virtually open, load and "shoot." (Kodak hasn't decided whether to use the prototype on its Web site, but it can be viewed on Altia's site.) Such prototypes can be used to educate consumers about complex products or to test product designs prior to release.

END CUSTOMERS aren't the only ones multimedia can help educate. Robert Fagan, formerly an analyst with market research company IDC/Link, a subsidiary of International Data Corp. (a sister company of *WebMaster*), says that if he had to sell a conservative CEO on a multimedia Web project, he would start with computer-based training because "it saves so much money." Rather than send people out to live training sessions or pay to bring in instructors, companies can simply post the courses on their intranets. And compared with CD-ROMs, intranet-based training is cheaper and more easily updatable.

But before they start putting things in motion, companies must overcome several difficulties. Most Web-based multimedia technologies haven't reached their first birthdays yet and still have performance problems over dial-up connections, such as long download times and jerky audio and video playback. Multimedia plug-ins often work only with select operating systems and browsers, thus obliterating the ecumenical accessibility that made the Web so popular in the first place. In addition, the creative and technical skills needed to create compelling multimedia applications are different from those required for more traditional text-based Web applications.

"You need a team of people who have expertise in the associated media," says Skip Green, project manager for interactive learning technologies at BBN Corp. Audio and video skills are key, and project managers—like directors—must be able to pull together multiple media to deliver a message.

Companies should have a specific purpose in mind for the multimedia component, and they should test the applications thoroughly for usability, says Michael J. Palmer, director of the user interface laboratory at American Management Systems Inc.' s Center for Advanced Technologies. Recently, Palmer helped develop a multimedia interface for a Web application in which an animated train showed users where they were in an installation process. In a testing forum, users said they thought the train was cute but not especially helpful. "If it doesn't help them through a task, don't use it," Palmer advises.

Web-based multimedia is so new that examples of full-scale implementations are in short supply. Still, some leading-edge companies are using it in business applications, especially on intranets, which are less constrained by bandwidth than the Internet. The following are some examples.

Motorola University
Designs of the Times

AT MOTOROLA University, engineers used to play with Tinkertoys. Now they can play with virtual building blocks in an animated game on the corporate intranet. That might not sound very mission-critical, but it is.

The university, Motorola Inc.'s corporate training branch, offers a course on designing high-quality products and manufacturing them efficiently. Engineers start by playing a game in which they build simulated products using Tinkertoys. A value is assigned to each piece and each connection, so students incur charges every time they link pieces. The company says employees completing the course are better at meeting quality and marketing specifications while lowering manufacturing costs.

It's a popular exercise, but there's a human bandwidth issue: Engineers can't always get away from their regular work to attend training. So in September 1995, Motorola hired interactive communications company Tobin Erdmann & Jacobsen to translate the course to a CD-ROM. In the CD-ROM version, engineers design a water piping system for a housing development using pumps, T-joints and pipes.

In April, when Macromedia Inc. announced the Shockwave version of Authorware, its multimedia authoring tool, Motorola had Tobin Erdmann & Jacobsen translate the program to the company's intranet. "We thought the Web would be a good way to distribute the game without going through the trouble of making CDs, doing the mailing and all the stuff you have to do when you demo a product," says John Manion, product planning manager for Motorola University.

In the Web version, each piece is tied to manufacturing-information suppliers, quality ratings, prices and so on. Engineers drag and drop pieces together, and a ticker tracks costs. "We make it easy to see how easy it is to lose money," says Peder Jacobsen, vice president and director of training at Tobin Erdmann & Jacobsen.

Initially, Motorola is using the intranet game to introduce the course: It hopes engineers will sample the program online and then order the CD-ROM. But if the Web version is well-received, the company may consider offering the entire

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Multimedia—typically associated with massacre games and **bandwidth-hogging** promotional sites—can be put to work by real businesses for real **business purposes.**

training program over its intranet. That move would not only reduce distribution costs but also let Motorola track who's using the program and what their scores are—information that is important for certification.

In addition to cutting costs, intranet deployment plays to Motorola's need for speed and reach. The company is soaking up new employees rapidly—it has added several thousand engineers at U.S. sites in the past two years alone. At the same time, it is constantly working to renew its quality culture, and that means keeping all employees, old and new, up-to-date. "Someone said, 'By the time you turn this into a course, it's history,'" says Manion. "So we have to find ways of making this information accessible almost as it occurs."

Northern Telecom
Switching Models

MASTERING THE communications equipment manufactured by Northern Telecom Ltd. is definitely not a no-brainer. So it's not surprising that Nortel's customers—companies like GTE Corp., Williams Telecommunications Systems Inc. and the Baby Bells—are willing to shell out from $600 to $4,000 in tuition and up to $3,000 in travel expenses for each technician they send to a Nortel training program. That's as much as $7,000 for each student, and 22,000 students will pass through Nortel's four training centers this year alone.

So Nortel began putting its courses on CD-ROM, using virtual reality to emulate, as closely as possible, the hands-on experience. But CD-ROMs are expensive to mail and are not updatable, and those characteristics cause problems when you have a line of switches that gets updated every six months. Then last May, Superscape VR PLC, Nortel's virtual reality software vendor, announced a move to the Internet. "That really interested us and helped us change our focus," says Darrell Ferris, Nortel's senior manager of virtual reality applications design.

For Nortel, full-fledged virtual reality (as opposed to VRML, a comparatively basic language) is the best of all possible solutions. "We investigated [many other] opportunities, including distance learning, video and plain old computer-based training. None of those really fit the bill," says Brad Kuhne, senior manager of business development for Nortel's virtual reality group. "We need to be able to demonstrate [working with the product] hands-on. We need the knowledge retention that studies have shown VR provides. And we need something that is exciting and new to keep students interested so [customers] get their dollar value."

"It's as close to working with the actual product as you can get without having the real thing in front of you," says Ferris. "I can pop off the module covers; I can pull the circuit backs out; I can run cables; I can type things on a simulated terminal that emulates one of our switch languages to teach people how to program that."

Since virtual reality is a glutton for bandwidth, Nortel is creating customized training applications that customers can run on their own intranets rather than download them from the Net. (The first such program, written for Nortel's Remote One tracking tool, was scheduled to go live on a major distributor's internal Web this month.) Alternatively, qualified users—i.e., not the competition—will eventually be able to buy the programs straight off Nortel's Web site. The company already has several demos available for download as well as the Superscape Viscape plug-in required to view them.

That type of delivery should prove cheaper not just for Nortel but for its customers as well. "If we can make our modules very object-oriented, then customers can just take the task or feature they need to learn and pay a much-reduced fee," says Kuhne. "With CD-ROM they have to get the whole package."

Corporate Express
Waste Watchers

WOULD YOU BELIEVE that the average cost to procure a pencil in a large company is $150? If your answer is no, you're not alone. To drive home its point about corporate wastefulness—and hence the need for its services—Corporate Express Inc. built into its Web site animation that illustrates how those charges pile up.

Corporate Express is a $2.4 billion company that provides corporations worldwide with 24-hour delivery of all kinds of supplies and services. The company's competitive pitch is that it manages the supply chain from manufacturer to final user, helping to cut overall procurement costs by as much as half.

But that argument works only if customers understand the process that produces the $150 pencil. So Corporate Express hired Internet design company Eagle River Interactive Inc. to create a Shockwave animation on its Web site that leads customers through a typical procurement process: Person one needs a pencil, person two approves the purchase, person three orders the pencil and so on. During the demonstration, a counter adds up the dollars.

The multimedia dimension is critical, says Jennifer Maher, director of new media at Corporate Express. "By presenting that in a big graphic, you don't get the same im-

pact you get by walking someone through the process."

The company is using the same approach in a section of the site devoted to the ergonomically correct office. Visitors to the online office, created using Adobe Systems Inc.'s Adobe Photoshop and software from Silicon Graphics Inc. subsidiary Alias Wavefront, can adjust a chair, monitor, keyboard or wrist rest to the maximally healthful positions. Rather than cluttering the image with text or forcing users to move back and forth between screens, a voice-over produced with Shockwave's streaming audio function talks users through the process. The section helps develop relationships with customers, who may come to think of Corporate Express as a business information resource rather than just a supplier. And since the company *is* a supplier—of office furniture, among other things—the application serves as a valuable promotional device.

In planning its site, Corporate Express faced a dilemma shared by everyone trying out new technologies: the tradeoff between maximum accessibility and useful, exciting features. The company came down on the side of the latter, figuring that multimedia technologies are advancing so quickly that they'll soon be mainstream. But when it was debating those issues last spring "we had to decide whether we were going to design for today, for the fall or for 1997," says Maher. In the end, "we designed for the technology that will be out this fall."

FINDING IT ONLINE

Adobe Systems Inc.
www.adobe.com

Alias Wavefront
www.aw.sgi.com

Altia Inc.
www.altia.com

American Management Systems Inc.
www.amsinc.com

Autodesk Inc.
www.autodesk.com

BBN Corp.
www.bbn.com

Black Sun Interactive Inc.
www.blacksun.com

Corporate Express Inc.
www.corporate-express.com

Eagle River Interactive Inc.
www.eriver.com

International Data Corp.
www.idcresearch.com

Macromedia Inc.
www.macromedia.com

Motorola Inc.
www.mot.com

Northern Telecom Ltd. (Nortel)
www.nortel.com

PictureTel Corp.
www.picturetel.com

Planet 9 Studios Inc.
www.planet9.com

Superscape VR PLC
www.superscape.com

Technologic Partners
www.tpsite.com

Tobin Erdmann & Jacobsen
www.tej.com

White Pine Software Inc.
www.wpine.com

World Bank
www.worldbank.org

World Bank
Global Gatherings

FEW ORGANIZATIONS are more global than the World Bank. The Washington-based development institution has offices or partner organizations in all 180 nations that are its members—every country except Cuba and North Korea—and consequently an urgent need for global communications. In an era of tight budgets and limited travel resources, videoconferencing offers a solution.

The organization uses PictureTel Corp. systems, set up in several offices around the world and run by its Information and Technology Services department, as its official videoconferencing service for large group meetings and training sessions. But for smaller, ad hoc get-togethers, the Internet presents a cheaper alternative. Two years ago, the World Bank started using CU-SeeMe, an Internet-based desktop videoconferencing system developed by Cornell University. Now it has upgraded to an enhanced commercial version from White Pine Software Inc. and is experimenting with it to run small meetings and conduct virtual seminars among employees in the United States, Russia, Egypt and other countries.

Pricewise, the Internet system can't be beat. Users need no special equipment to view a conference; to participate they need a camera (which can cost from $100 to $300), a soundcard, a videocard (if their camera is not digital) and a microphone (if their computer terminal doesn't have one built in). "If you have an Internet connection, the marginal cost can be zero," says Peter Knight, chief of the bank's electronic media center.

In addition, because CU-SeeMe is packet-switched, it is cheaper to run than circuit-switched systems. For the World Bank, CU-SeeMe's low price means it can afford to let more employees work collaboratively with their geographically dispersed colleagues.

Not surprisingly, with the big difference in price comes a big difference in quality. A CU-SeeMe image is small—at the most 4 inches by 4 inches, depending on the monitor being used—and a little jerky. But the Internet product's functionality is sufficient for the bank's purposes, Knight says. Users can brainstorm on the same electronic whiteboard, and they'll soon be able to share applications as well. "Most people wouldn't want to teach a class, but if you want to get a couple of people together and have a seminar, it looks great to me," Knight says. "You can see body language and share facial expressions or video images or high-resolution snapshots."

Knight says the product still faces a psychological hurdle because most bank employees aren't familiar with desktop videoconferencing. But time, he says, will take care of that. "Fax machines were considered exotic devices 10 years ago, and now it's rare that people have little cameras on top of their computer screens," Knight says. "But I think it will be very, very common in a few years." WM

Freelance writer Lynda Radosevich can be reached at lradosev@interserv.com.

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Maximizing traffic is priority number one for most sites, but popularity has its price. Here's how some of the big-leaguers coped when the surfing public loved their sites to death.

BY SIMSON L. GARFINKEL

Crash Course

GARRY KASPAROV WAS THE WORLD'S REIGNING CHESS CHAMPION. Deep Blue was the **chess-playing** supercomputer built by IBM Corp.'s Thomas J. Watson Research Center in Yorktown Heights, N.Y. And while chess was ostensibly the mainspring of Deep Blue's existence, IBM hadn't spent **millions of dollars** developing the system just to play games.

Rather, **Deep Blue** was created to explore the limits of massively parallel processing systems. Chess just happened to be the closest thing to a perfect test of those limits, and Garry Kasparov happened to be the closest thing to a perfect test for Deep Blue.

The match was scheduled to begin on Feb. 10, 1996—the launch of a **year-long celebration** leading up to the 50th anniversary of the Association for Computing Machinery's founding in 1947. The ACM had put up a $500,000 purse, but even more attractive to IBM than the money was **the prestige that would accompany a win**. To make the event as public as possible, the company wanted to post the entire match on one of the slickest, quickest and most robust World Wide Web sites in the world.

The project team knew going in that the slightest glitch would be a major embarrassment. They also knew how easy it is to be embarrassed on the Web. Even as the IBM team labored away on its ACM Chess Challenge site, **hordes of football fans** overran and crashed **the Super Bowl site** hosted by Microsoft Corp., one of the few companies that was supposed to know its way around the Web.

ILLUSTRATION BY HENRIK DRESCHER

"Our servers were not crashing. They were performing well considering the load they were running under. It's just that there were not enough of them."

–Bill Koszewski

THE SUPERVISION OF IBM'S CHESS SITE fell to Carol Moore, the company's director of corporate Internet programs. Moore hired K2 Design Inc., a Web design company with which IBM had worked in the past. K2's first problem was time: The site had to be up and running in one month.

IBM brought on Jake Prescott, then creative director at advertising company Ogilvy & Mather Worldwide, as a consultant. A recreational chess player who had worked with Moore on other Web projects, Prescott had been an early promoter of the match—even before Kasparov had signed on—and he wanted the site done right. Prescott became the project's brand steward and head copywriter. He wrote essays on the meaning of this computer chess event that pitted man against machine. He created personalities for the real-time chat rooms to keep the talk on target. And he watched as the part of the site that delivered still video images of Kasparov came together. There was also, of course, a computer-generated chessboard tracking the game's progress, move by move.

As the date closed in, Moore asked her colleagues at IBM how big a server she would need to host the event. "The consensus was that you shouldn't underestimate," she recalls. IBM had hosted the official Web site for the U.S. Open tennis tournament, and that site had attracted more than a million hits a day. Moore figured that the chess tournament would draw 100,000. To be safe, she told K2 to plan for 200,000 hits a day. K2 agreed.

In order to complete the project on time, K2 turned over much of the labor to a small Web hosting outfit in Cambridge, Mass., a reputable company that K2 had recently bought. Planning for the worst, the subcontractor set up a high-end workstation with 512MB of RAM and connected to the Internet via a 10Mbps link.

The site opened for business at noon on Saturday, Feb. 10th. The match started at 3 p.m. in the Lecture Hall of the Pennsylvania Convention Center in Philadelphia. "I was there in the chat lines," recalls Prescott, who had gone so far as to recruit international chess masters for play-by-play commentary. "I could see people rolling in from Norway, Australia—from all over the world—enthusiastic about chess, wanting to know what was going on, talking about the algorithms that were driving Deep Blue."

Shortly after the match began, something went wrong. The server slowed, then started to crawl. "We couldn't get into our own Web site to maintain the chat room," Prescott says. "It was pretty much paralyzed by the time the match got going. Forget about seeing the chessboard and the real-time stuff. Just getting into the Web chat was hard. I kept hammering away at it and got in one time out of 10."

On the stage in Philadelphia, Kasparov was in trouble as well. He would eventually lose the game—at that time his only loss to a machine. But out on the Internet, the reverse was happening. Hundreds of thousands of Internet surfers, curious to see the "ultimate" battle between man and machine, had brought another computer to its knees.

During the peak of the tournament, IBM says, the Web server was nailed with more than 1 million accesses per hour—impressive but, according to the group's estimates, not enough to cause such chaos. For every user who downloaded an HTML page, there were another 50 whose clicks went unanswered. It appeared that IBM needed a site that could handle not 200,000 hits a day but 10 million.

DAVE GROSSMAN'S TELEPHONE started ringing at 7 a.m. on Sunday, Feb. 11. Grossman, a senior staff member at IBM's Internet Division Advanced Technology Group in White Plains, N.Y., was part of an elite team assembled by IBM to build systems capable of hosting huge Web "events." He attacked the problem by bringing in the WOM, or Web Object Manager, a superpowerful server running on IBM's SP-2, a multiprocessor supercomputer that is a close cousin of Deep Blue (see box, Page 44).

The WOM had handled the U.S. Open Web site as well as the site for The Masters golf tournament and had performed flawlessly both times. Transferring the site to the WOM was an obvious solution. But with the second game scheduled for that afternoon, there simply wasn't time.

So Grossman tried the next-best thing. Using a technique called "inlining," he moved the big, bandwidth-hogging files from the server in Cambridge to the SP-2. He left on the original site the Common Gateway Interface (CGI) scripts, the HTML templates, the chat rooms and the control logic that made the whole thing work.

But when the match resumed at 3 p.m., so did the chaos. Once again, there were millions of hits on the original workstation. Once again, the chess pages slowed to a crawl. Once again, the chat rooms

Deep Blue is Back

Next May, a new, improved Deep Blue will seek revenge against world chess champion Garry Kasparov. IBM scientists say the modified computer is capable of beating last year's model three times out of four.

www.web-master.com

were unusable. And once again the Web site was, in the highly technical language of Grossman's group, "toasted."

The moment Kasparov emerged triumphant, Grossman and his team tore the Web site apart, intending to rebuild it on the WOM. As it turned out, they didn't have to. In the process of dismantling the site, they discovered a strange inefficiency in the software used to build the chessboard.

The program, which had worked well on less trafficked chess matches and had been obtained by K2's subcontractor, was designed to send one graphics interchange format (GIF) file for the blank board—and then up to 32 more pictures, one for each chess piece. Each time someone tried to look at the chessboard, 33 different connections had to be set up and then taken down. That load was breaking the Web site's back.

Dave Grainger and Sean Martin, both from IBM's Hursley Laboratories in England and on assignment to Grossman's team, wrote a program that reduced the 33 GIF files to a single image. In the time left, they wrote another program to process the log files from Deep Blue and display the intermediate results—what Deep Blue was actually "thinking"—on the Web site. Meanwhile, Andy Stanford-Clark, a scientist at Hursley, modified the SP-2's Apache Web server, building into it many programs that were formerly run as CGI scripts.

By Tuesday morning the WOM was ready. And the media were waiting. When Grossman picked up *USA Today*, he saw a front-page headline that read "IBM Site Stalemates Users."

IBM isn't the only high-technology company that has suffered public embarrassment at the hands of the unpredictable Web. At the same time IBM was putting together the chess site, Microsoft was learning from its Super Bowl fiasco and trying to reconfigure its Internet connection to cope with massive demands on its Internet add-on product site. The company installed a T3 connection that could pump data through a fiber-optic cable at 45Mbps. Yet despite that impressive speed, the new connection was overloaded in a matter of weeks.

In early spring, Microsoft hooked up a second T3 connection to relieve the burden. Each connection led directly to one of the nation's two largest Internet providers, Sprint Communications Co. and MCI Communications Corp. That double-barreled solution worked until late May, when Microsoft posted a beta version of Internet Explorer 3.0. Once again, the lines were taxed beyond their capabilities.

The software giant was learning from its mistakes, but it was learning slowly. Preparing for the official release of Explorer 3.0 in August, Microsoft installed eight T3 lines to its Redmond, Wash., site and arranged for mirror sites in San Jose, Calif., and Washington, D.C., to hold copies of Explorer. Finally, it looked like all was well. Microsoft was clocking 20,000 simultaneous connections to its Web servers, according to Internet Explorer Product Manager Bill Koszewski, and the company's data circuits were still at only 50 percent of capacity.

That was the good news. The bad news was that downloading Explorer is only half of the installation process. The second half requires users to register, providing such information as name, address and telephone number. To handle that traffic, Microsoft had set up a pool of 16 Compaq Computer Corp. servers, each equipped with four Pentium processors running in parallel. It was an impressive battery of machines, but it wasn't enough. In the days immediately following the rollout, most people who tried to connect were greeted with the message "Server busy; try again later."

"We owe our users an apology," says Koszewski. "This has happened before."

GAMe PLANS

Those who do not learn from history are doomed to repeat it. Here are some of the lessons of The ACM Chess Challenge site—and tips for avoiding its problems.

Be Prepared. It's impossible to predict how popular a site will be, *but try*. IBM's original chess site was built to handle 200,000 hits a day. It should have been built for 200,000 hits an hour.

Have Backups in Reserve. Always have a second, fully configured machine that you can swap into your system if problems develop with the first. Have a contingency plan in the event that your backup doesn't work.

Know Your System. IBM's "stalemated" Web site ended up on the front page of *USA Today* because a critical piece of software that had been outsourced to a subcontractor didn't work the way it was expected to work. If your system is critical, make sure that somebody on your staff tests every function.

Have Weekend Support. IBM saved itself further embarrassment because it was able to assemble its White Plains team on a Sunday morning and have it work through the day and late into the night.

Test Your Site. If possible, test your Web site with a realistic load. But even if you test it, remember that something can always go wrong.

"Forget about seeing the chessboard and the real-time stuff. Just getting into the Web chat was hard. I kept hammering away at it and got in one time out of 10."

–Jake Prescott

INSIDE THE WOM

IBM's WOM Web server runs on an IBM SP-2 scalable multiprocessor computer. Each processor is a high-speed RS/6000 computer with 128MB of RAM and an ultrafast connection to a network of 67MHz PowerPC processors. Running on top of that is a special version of IBM's AIX operating system, a modified version of the Apache Web server that runs on the multiple processors, and an operating system that automatically spreads incoming Web requests across the various processors. A 45Mbps T3 connection to the Internet's backbone feeds the whole thing.

Koszewski says the problem was not software but hardware. "Our servers were not crashing," he says. "They were performing well considering the load they were running under. It's just that there were not enough of them."

A different problem had plagued another high-volume Microsoft site in July, two days after MSNBC, the joint Microsoft/National Broadcasting Co. news site, went live (see "The Peacock's New Feathers," *WebMaster*, September 1996). When TWA Flight 800 crashed into the Atlantic, a flood of Internet users called up the site for the latest report, and many were turned away. In that case, says Jeff Reisman, a group program manager at MSNBC, the problem was that servers were running different versions of the Open Database Connectivity (ODBC) driver, which lets the Web server access information stored in relational databases. Reisman says that in an all-out push to get the mammoth site up by the launch date, no one noticed the problem. The result was a slow memory leak that eventually stopped Internet service until the service was restarted.

"We had incredible time pressures," Reisman says apologetically. "We built the hardware in the last two weeks, with many on our team working extremely long hours."

WHILE MANY OBSERVERS blame such incidents on rapidly increasing Internet volume, the problem has been around as long as the Web itself. In August 1994, for example, when *www.playboy.com* went online, a monstrous traffic jam kept out thousands of surfers who were doubtless eager to read the articles. Worried that the site would be swamped, Eileen Kent, Playboy Enterprises Inc.'s vice president of new media, had planned ahead and purchased a T1 line. But it wasn't good enough. As soon as the Playboy site was launched, Kent began receiving reports of rejected connections and pages that would come up only in pieces.

The problem, Kent says, was a bug that caused all TCP connections to try to reconnect after they had been dropped, resulting in a backlog of stuck connections. Playboy increased the default backlog of sockets so the server could handle 80 HTTP connections per second, and the site ran smoothly.

"I do recall sometimes I was really sweating," says Kent. "But it didn't last long."

Today Playboy's site runs on a cluster of Silicon Graphics Inc. Challenge machines, with one Sun Microsystems Inc. Sparcstation thrown in. And Kent has increased the bandwidth: *playboy.com* is now fed by two T3 lines and two OC-3's connected to multiple providers across the country.

Playboy's experience taught it an important lesson: Simply making sure that you have enough bandwidth and RAM isn't enough. If you configure unwisely or forget details, even a site with the fastest network connection running on the most expensive hardware can feel like a beleaguered 486 PC connected to the Internet by a 28.8Kbps modem.

Those were the same lessons learned—and finally applied—by IBM. On Tuesday, Feb. 13, when hundreds of thousands of people clicked into The ACM Chess Challenge site, the WOM smoothly served up the page containing the chessboard. And surfers with the right kind of browser were treated to a Virtual Reality Markup Language version of the board that let them fly around among the chess pieces.

On that day, Kasparov and Deep Blue battled inconclusively. The following morning, *USA Today*'s headline read "Game 3 Chess Match a Draw; IBM Site Up." Deep Blue's fortunes declined over the remainder of the match: In the fifth game of the six-game series, it rejected Kasparov's offer of a draw and went on to lose, four games to two. WM

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FINDING IT ONLINE

Association for Computing Machinery
www.acm.org

The ACM Chess Challenge
www.chess.ibm.park.org/

IBM Corp.
www.ibm.com

K2 Design Inc.
www.k2design.com

Microsoft Corp.
www.microsoft.com

Ogilvy & Mather Worldwide
www.ogilvy.com

Playboy Enterprises Inc.
www.playboy.com

Silicon Graphics Inc.
www.sgi.com

Sun Microsystems Inc.
www.sun.com

Super Bowl
www.superbowl.com

WOM: The Boiler Room
www.womplex.ibm.com/

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AT&T

Evangelical Fervor

The intranet team at a major national laboratory wanted to pump up enthusiasm for the internal Web—particularly among managers. So they gave it a week.

By Derek Slater

OAK RIDGE NATIONAL LABORATORY is tucked away in the shadows of eastern Tennessee's Appalachian Mountains for a reason. At its inception—during the Manhattan Project in 1942—ORNL's work for the U.S. Department of Energy was intended to be kept secret.

ORNL is one part of a public/private cooperative venture that also includes Lockheed Martin Energy Systems (LMES).The combined research facility comprises three campuses separated by 10 miles of verdant foothills that lend a down-in-the-boondocks feeling to an area that handily outscores some major metropolises in doctorates per capita. Bethel Valley Road, the only route into ORNL/LMES, winds past occasional chain-link fences and abandoned observation posts. The gates are manned by guards who, in their congenial Tennessee manner, will turn back a familiar face who's forgotten a security badge.

An organization that grew up ringed with barbed wire presents plenty of cultural challenges to the freedom-loving World Wide Web. To meet those challenges, ORNL/LMES's intranet supporters have embarked on a series of activities designed to secure buy-in—particularly from management. Those events culminated in June with Web Week, an ambitious allocation of time and resources to the cause of intranet evangelism.

While ORNL/LMES's efforts to spread the word have been unusual, its experiences with the Web have been fairly

Photographs by Mark Tucker

www.web-master.com/

SUPPORT IN HIGH PLACES: Director Alvin Trivelpiece is a fan.

THE NEED FOR SALESMANSHIP: Not everyone at ORNL/LMES has embraced the Web, according to Mike Cuddy and Kathy Smith. Concerns about investing in nonessential work and losing control of information are among the reasons.

predictable. A mishmash of applications has sprung up over the past three years, carried along by grass-roots enthusiasm. The vision driving this growth is summed up by the phrase "virtual collaboration," a model that would allow the facilities' 14,000 employees to work together in various configurations on projects ranging from neutron-scattering techniques to advanced computing and robotics. Pro-Web workers at ORNL/LMES see the intranet as a means of accelerating that type of research through faster communication and better access to large amounts of data.

The Environmental Sciences Division kicked things off when it posted the first ORNL internal Web page in the summer of 1993, smack on the heels of an initiative to start making data available on the Internet via gopher. (A major internal gopher publicity push on Groundhog Day 1994 was in many ways the forebear of Web Week.) By November 1994 the Labs had established a Web server hosting content from several divisions as well as the first external home page for ORNL. The following February, the organization shut down its gopher efforts. Meanwhile, the initial project group had evolved into the Internet Technologies Coordinating Council and established an Internet Technologies Working

www.web-master.com/

Group, with representatives drawn from divisions that had pages up at the time. They started bandying about the concept of an intranet but realized they could not proceed without the official blessing of higher-ups.

So in the fall of 1994, the Internet group demonstrated to senior management the departments' work to date. The response was encouraging in many respects, according to the group's head, Becky Verastegui of ORNL's Computing, Information and Networking Division. Alvin Trivelpiece, director of ORNL, was especially receptive. "Our director is a big supporter," says Verastegui. "He's always got the latest beta of Netscape on his system."

On the other hand, there was no formal takeover or adoption of intranet development. The central IS department supported Web activity, judging the intranet to be a good fit with the enterprisewide move toward three-tier client/server computing. But divisions would have to continue footing the bill for their own projects. For the time being at least, intranet development remained squarely in the hands and budgets of the masses. "Basically, we didn't get any money, but they said, 'Go forth and do good,'" Verastegui says.

So the working group went forth and in February 1995 sponsored a one-day Web Technology Showcase to educate ORNL/LMES about the technology's potential for enhancing collaborative research. This presentation of Web pages, applications and the tools used to create them was "packed to overflowing," Verastegui says. The event produced a new swell of enthusiasm, and soon division after division was flocking to the intranet.

So effective was the Web Technology Showcase that when the Web champions sat down to plan a 1996 follow-up, they found too many intranet success stories to highlight in a single day (see box, Page 51). Thus, Web Week was born.

The planners of Web Week had several goals: to highlight recent developments in ORNL/LMES's external and internal Webs, to introduce new users to the basics, and to help researchers and administrators use the intranet to perform more effectively. Most important, though, Web Week was designed to tackle a number of thorny management issues—some head-on, others more obliquely.

The thorniest was simple resistance: Not all departmental managers have embraced the Web. "My money goes to move dirt," says one manager unconvinced of the technology's utility. Others, while not rejecting the Web wholesale, have their own concerns, one of them financial. According to Kathy Smith of the LMES Corporate Information Management Strategies and Architectures Group, the whole organization is somewhat on edge these days because of uncertainty about whether the DOE will continue to support national laboratories like ORNL/LMES at current levels. With that cloud hanging over them, some divisional heads aren't thrilled about investing time and money in what might be regarded as nonessential work.

There has also been talk of downsizing, and ORNL/LMES employees tend to equate data security with job security. Some department heads fear they could somehow become expendable if a department's heretofore confidential data is publicly posted and understood by everyone, Smith says. Mike Cuddy, CIO for LMES, puts it more simply: "Information is the kingmaker."

And at ORNL/LMES, as at most companies adopting the Web, the specter of productivity lost has people worried. "Some managers think [the Web] is a waste of time because of the abuse issue," says Bill Kimmerly, manager of the LMES Corporate Information Management Strategies and Architectures Group. In

Software and Technology

ORNL/LMES's two primary Web servers are Digital Equipment Corp.'s AlphaServer 2100s running the Digital Unix operating system, the NCSA HTTP Web server (soon to be replaced by the Apache Web server), the WAIS distributed information retrieval system and the Harvest search engine from the University of Colorado (soon to be replaced by the Open Text search engine from Open Text Corp.). Applications are developed in Perl and C; most database applications use Oracle Corp.'s SQLNet and ProC. The organization also uses several Intel Corp. Pentium-based servers running Microsoft Corp.'s Windows NT and Netscape Communications Corp.'s Enterprise Server. Applications on these servers are developed in Perl, C and Microsoft Corp.'s Visual Basic and Visual FoxPro.

ORNL/LMES's online user directory is based on a locally developed Web interface to a CSO/Ph service. The organization plans to implement Action Technologies Inc.'s Web-based workflow system, develop applications in Java and create a local public-key infrastructure to authenticate users and enable secure communications.

ORNL/LMES uses a range of authoring tools, including Netscape's Navigator Gold, Adobe Systems Inc.'s Adobe PageMill and Adobe Acrobat, Sausage Software's HotDog Web Editor, Brooklyn North Software Works Inc.'s HTML Assistant Pro, and Microsoft's Internet Assistant and text editors.

response, the organization has put in place some tough policies, and several employees have been fired for excessive or inappropriate personal surfing. While that has largely solved the abuse problem, it has also engendered a certain degree of paranoia. One staff member, for example, reported keeping a notebook beside his computer; if he accidentally winds up on a site that contains inappropriate or non-work-related materials, he assiduously notes the date and time, the URL, and the reason for the mistake.

THE INTERNET group advertised Web Week through a mass e-mailing and via an old-fashioned, paper-based method: pasting eye-catching posters on doors around the campuses. The event took place June 24-28 in two auditoriums, and sessions were simulcast over the facilities' local broadband and Multicast Backbone networks to allow employees who couldn't spare travel time to watch from areas closer to their workspaces. Clusters of people sitting in meeting rooms and staring at screens were a common sight throughout the week, especially at lunch time. Building lobbies, meanwhile, were dotted with stations where divisional representatives demonstrated their groups' handiwork in one-on-one sessions.

In order to accommodate the staff's wide range of interests and Web experience, organizers divided the week into several tracks. The beginner and techie tracks—each led by ORNL/LMES staff—were held concurrently as there seemed little danger of overlapping audiences. The introductory course included how-tos on using search engines, building a home page and working in HTML. The techie sessions, meanwhile, explored Java, Web database technologies, multimedia and other advanced topics.

There was also a research track, featuring presentations on such light-sounding topics as Online Harsh Environment Laboratory and Small Angle Neutron Scattering. Of particular interest to this crowd were examples of their colleagues using the intranet to participate remotely in experiments. Midweek, for example, a group of researchers gathered in dimly lit Wigner Auditorium to watch an enthu-

SELLING POINTS

Tips for your own Web Week

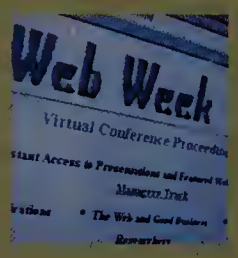
- Keynote speakers from outside the company are a big draw and lend credibility to your efforts.
- Avoid scheduling presentations very early in the morning or very late in the day. Attendance and attention spans drop off.
- Take time to recognize new applications and useful pages.
- Include and target employees from all parts of the enterprise.
- Call for active participation early and then follow up. Give people time to get their presentations in shape.

A Voice in the Wilderness

The Web hasn't always been as popular at ORNL/LMES as it is today. Forrest Hoffman of the Environmental Sciences Division describes the controversy that erupted when he established the organization's first Web server three years ago:

"As is probably true in many organizations, the first webmaster was a technical person outside the information services and computing services organizations. [That fact], coupled with the growing popularity and use of the Web, caused a great deal of conflict internally. In fact, it was so bad here that I was nearly fired. The computer security organization threatened to shut down my server. The information services folks were angry because [the Web] bypassed paper publications. They recognized the implications of this new technology with which they were not yet familiar.

I received threatening phone calls from computer security and disparaging e-mail and internal news messages. A few people spoke out and urged me to continue 'pushing the envelope,' realizing that we were behind the times and needed to use technology to make us more competitive.



I had the opportunity to demonstrate the technology to the Laboratory associate directors, who immediately asked me to include information about the Advanced Neutron Source (a project that Congress has terminated but which was very much in the spotlight at the time). Taking existing documents and photos developed by the public relations department, I created online information and advertised it widely on Usenet and elsewhere. This ruffled many feathers in the information services organization but provided the final impetus for getting an official public Web server and getting everyone involved.

[Internet group head] Becky Verastegui and [technical information officer] David Hamrin helped bring it all together by supporting the use of the technology and—in a very real way—calming the alarmed staff.

The irony is that now I am credited by many with bringing ORNL into the present with regard to the Web. I have received a number of awards at the Laboratory level and within my

siastic scientist demonstrate how ORNL/LMES associates on the West Coast can receive over the Net visual images from the lab's electron microscope and shift the instrument's view by typing in commands.

But the evangelism cause was best served by the plenary and management tracks, which were designed to offset managers' concerns. "We still have work to do to convince managers to get Ethernet to the desktop and to upgrade desktops," says Smith. "Part of our desire was to continue educating and also to establish in management's mind that this is a viable business tool."

Wanting to present some fresh voices on the topic, event organizers brought in several outsiders to address bottom-line issues such as ROI and using the Web to do business. Alex Zoghlin, president of Neoglyphics Media Corp., a member of the original Mosaic development team at the University of Illinois and a designer of the Secure Sockets Layer security protocol, gave an opening-day talk titled "Electronic Commerce on the Bleeding Edge." Tim Horgan, webmaster for *CIO* and *WebMaster* magazines, addressed the issue "Is the Web a Real Business Tool?" (His presentation is available at *www.cio.com/WebMaster/sem5_intro.html.*) Microsoft Corp. and Netscape Communications Corp. were also invited to send speakers, but neither company responded.

WHILE THE PLENARY and management sessions validated ORNL/LMES's overall Web strategy, others aimed at more nuanced attitude adjustment by offering concrete solutions to nettlesome problems. One presentation, for example, took on the topic of potential funding sources within the DOE. A session on excessive surfing encouraged employees to select an Internet access provider for a home account. But even that is only a partial solution, suggests Kimmerly. "If you have a [manager] whose fundamental mind-set is to distrust human nature, there's not very much you can do about that," he says.

WHILE NO ONE at ORNL/LMES would say how much Web Week cost, the organizers describe it as inexpensive. Indeed, the greatest costs were those associated with planners' and attendees' time. In terms of monetary expenditures, most went for printing posters and bringing in speakers; in addition, ORNL/LMES rules mandated the hiring of union workers to schlep tables and equipment.

Nor were the results easily quantifiable, although the organizers were pleased to note both increased intranet traffic and a surge in requests for application development help. In addition, two weeks after the event, ORNL management formally endorsed an online information center designed to provide Web access to data in ORNL/LMES's legacy systems. While the effort was already under consideration, Smith says, Web Week and other educational efforts played a significant role in its acceptance. (Management had also allocated money prior to Web Week for the intranet, one of very few new items in the budget, according to Nancy Norton, a member of ORNL's Computing, Information and Networking Division, responsible for information access and dissemination and one of Web Week's key planners.)

Still, neither the event's planners nor the IS organization harbor illusions that Web Week resulted in the wholesale conversion of every manager and employee. For starters, not everyone was able or willing to attend the festivities. Some managers even warned their groups against spending too much time at Web presentations at the expense of more vital job functions. "It's not a wholehearted endorsement," says Smith. "It's more, 'Do what you can.'"

But that's good enough for LMES CIO Cuddy, who, while not directly involved in Web Week, shares the goal of achieving management buy-in for the intranet. "I don't spend a lot of time on the hard sells," he explains. "I like to fish where there are fish." WM

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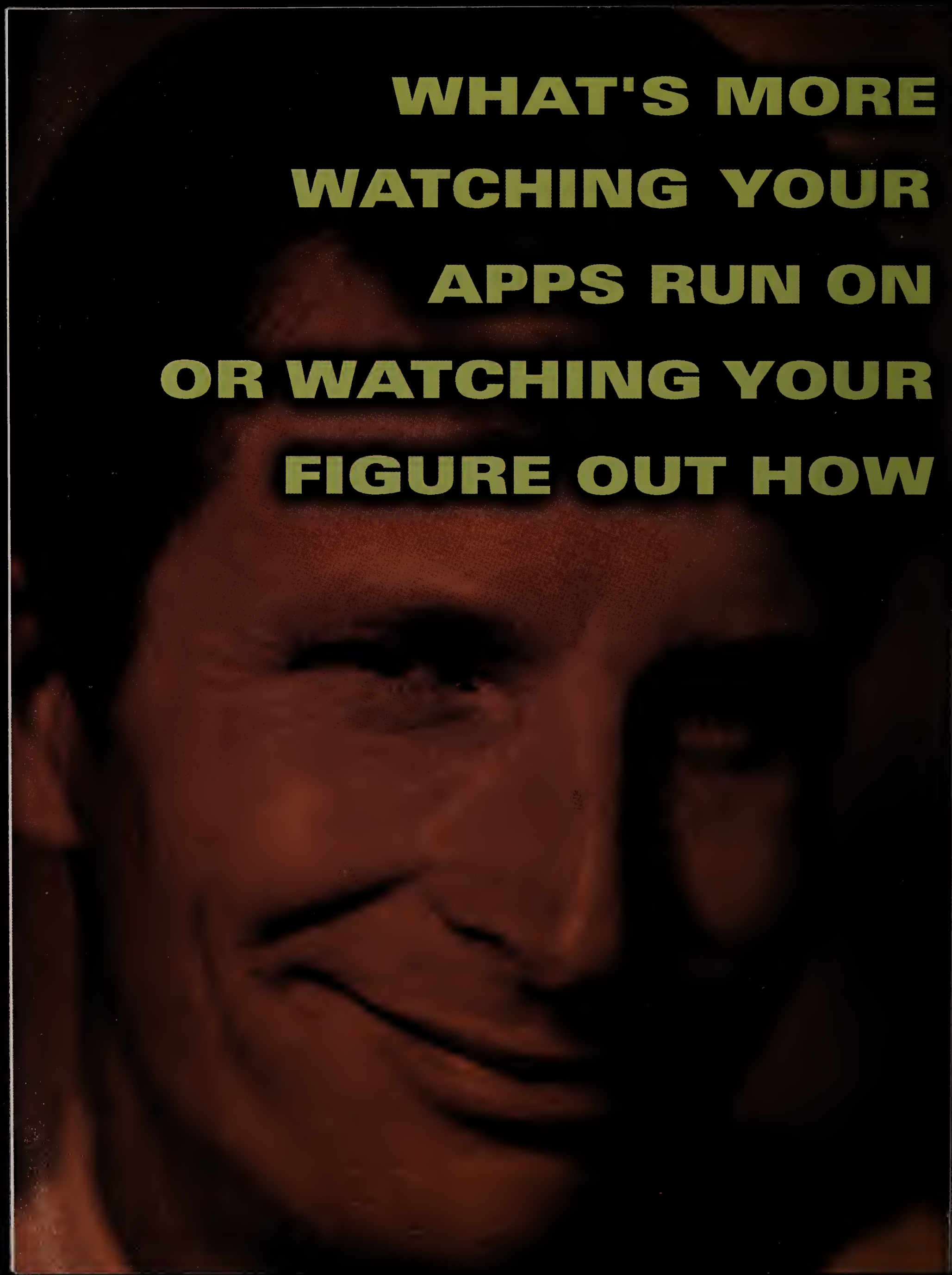
FAITS ACCOMPLIS

A sample of ORNL/LMES's intranet applications

- Corporate and divisional financial information
- Prism: Property Information System, which enables employees to maintain and update information about property assigned to them
- Searchable databases, including the Biofuels Information Network, Transgenic and Targeted Mutant Animal Database, Buildings Energy Research Bibliography and others
- Human resources data, including GLIWeb, a general locator system that gives employees the ability to update their personal contact information

own division for doing that for which some had wanted me fired or jailed. I now know most of the people in the computer security and information services organizations, and we respect each other and work together. Much of the material I developed was moved to a central 'official' server when it was available, and I helped get it all going so that the information professionals could take it from there.

ORNL is a great place to work, and although we have our own bureaucratic snafus like anyone else, we usually come through them with great success."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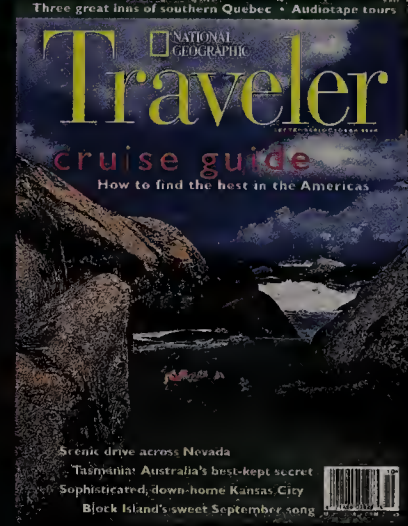
Taking on the

PAGING THROUGH THOSE GLOSSY TRAVEL MAGAZINES, armchair adventurers can linger over lushly illustrated packages with titles like "The World's 40 Best Beaches," "Meandering Through Munich" or "Diving For Sunken Treasure." Paging through the World Wide Web sites of the same publications a year ago, readers would have found little more than digital versions of those same articles. But today they'll find a dazzling selection of interactive trip-planning features that were never available on paper. They'll find, for example, up-to-the-minute weather forecasts, international travel advisories, airfare rates, coupons and deals along with links to thousands of resources, destinations and services.

Instead of accepting the magazine editors' list of world-class beaches, readers can compile their own by plugging personal criteria into databases like the one on the *Condé Nast Traveler* Web site. On *Travel & Leisure* magazine's site, an up-to-date currency converter lets users calculate, for instance, how many beer steins they can afford on a visit to Munich. And on the Web site of the National Geographic Society, readers were able to join a virtual expedition to recover gold and silver coins from a sunken Spanish galleon and even chat with the divers who explored the shipwreck.

BY ANNE STUART

World



As they move to the Web, travel magazines become more than just glossy guidebooks. Why settle for a description of Paris when you can book the flight, reserve the room and ask that the wine be properly chilled?

ON MOST MAJOR travel magazine sites, users can talk to other travelers in reader forums, swapping advice and opinions about travel services. And in the very near future, many travel magazine Web sites will offer one-stop services, helping trip planners find the best rates, identify interesting tourist attractions, and reserve and pay for airline tickets, hotel rooms and rental cars online.

While travel magazine sites capitalize on their paper parents' brand names, they've evolved online into something more interactive, more current and more dependent on the right alliances.

And why shouldn't they? Their experience represents the marriage of two of the Web's fastest-growing, most highly visible and most information-rich industries: publishing and travel. Now in the early stages of development, that relationship is complex and fraught with the potential for conflict. Because as electronic travel magazines partner with segments of the travel industry such as airlines and hotel chains, they necessarily face off against other service providers, such as travel agents. And travel magazine Web sites are also butting heads with an entirely new animal—the all-purpose travel site with no affiliation to a magazine. Such a site is Travelocity, a comprehensive effort by Worldview Systems Corp. and Sabre Interactive that allows visitors to book their own airline tickets and recently began a similar service for car rentals and lodgings.

In keeping with Internet culture, most travel magazine Web sites have been free to readers, while publishers have focused their revenue hopes on advertising, sponsorships, alliances or ancillary services. Some publications report that their sites have attracted additional subscriptions for their print publications. Others, such as *Condé Nast Traveler*, are enjoying considerable online ad revenues. Overall, however, no publishing site has come close to breaking even. In fact, according to Forrester Research Inc., most Web publishers won't see a return on their investments until the year 2000, primarily because of higher-than-expected costs. When they do start making money, Forrester says, advertising dollars—rather than subscriptions or transactions—will dominate the revenue stream.

Most publishers, worried from the get-go about cannibalizing their print products, came to believe that Web visitors expect more than a digital version of the text in this month's print magazine. They assumed that while Web travelers may read some stories online, they are looking primarily for links to resources, recommendations, related information and a chance to interact with editors and reporters—and with each other. And, publishers realized, there are few industries where that kind of link is more valuable than in the travel industry, where so much information changes from week to week. So the publishers gave their visitors more and invested more, and now they are searching for more and better ways to get their investments back.

"I don't think anyone has figured out what travel could be at its best online," says Joan Feeney, editorial director of CondéNet, the division of Condé Nast Publications Inc. that oversees all of the company's Web sites. "It's still absolutely a horse race, and nobody has the lead."

Condé Nast Traveler

IN JUNE 1995, Condé Nast, the New York-based publisher of lifestyle and women's magazines, launched its first Web site: *Condé Nast Traveler* Online. Looking back, Director of CondéNet Sarah Chubb notes that while it was well received and it linked to many travel resources, the initial site consisted of little more than the print magazine online.

A few months later, Condé Nast wanted to launch a site for its two food titles, *Bon Appétit* and *Gourmet*. Rather than feature one publication over the other, Condé Nast placed versions of both magazines on one Web site, called Epicurious. The site was conceived as one that would feature not only branded content linked to both print publications but also material that hadn't appeared in either magazine.

To Chubb's delight, Epicurious attracted regular subscribers as well as foodies who weren't necessarily readers of either publication or even part of the magazines' target demographics. Those new readers typically found the site while surfing and stayed to sample from a menu of choices broader than that offered in either publication. As a result, Chubb says, "we sold a lot of [print magazine] subscriptions to people who hadn't subscribed to either before."

The experience taught Condé Nast something. "Learning from the food site, we realized that the *Condé Nast Traveler* Online was too narrow," Chubb says. "We loosened up a bit as we realized the model on the Web is much more wide open."

Last May, CondéNet's products morphed again; *Condé Nast Traveler* joined the food magazines as part of an even larger Epicurious site. The site, which now holds more than 20,000 pages of information and employs 40 people, features content from *Gourmet*, *Allure*, *Vogue* and *Bride's* magazines as well as the Fodor's travel guides (owned by Advance Publications Inc., also the parent company of Condé Nast). That merging of diverse content, all wrapped up in the Condé Nast brand name, was something that could be accomplished only online, where the whole, in the best of cases, can be much greater than the sum of its parts.

Today, Epicurious Travel (slogan: "You're Virtually There") offers worldwide weather information, visitor forums, dynamically updated lists of bargain airfares, contests, visitor surveys and hundreds of destination links.

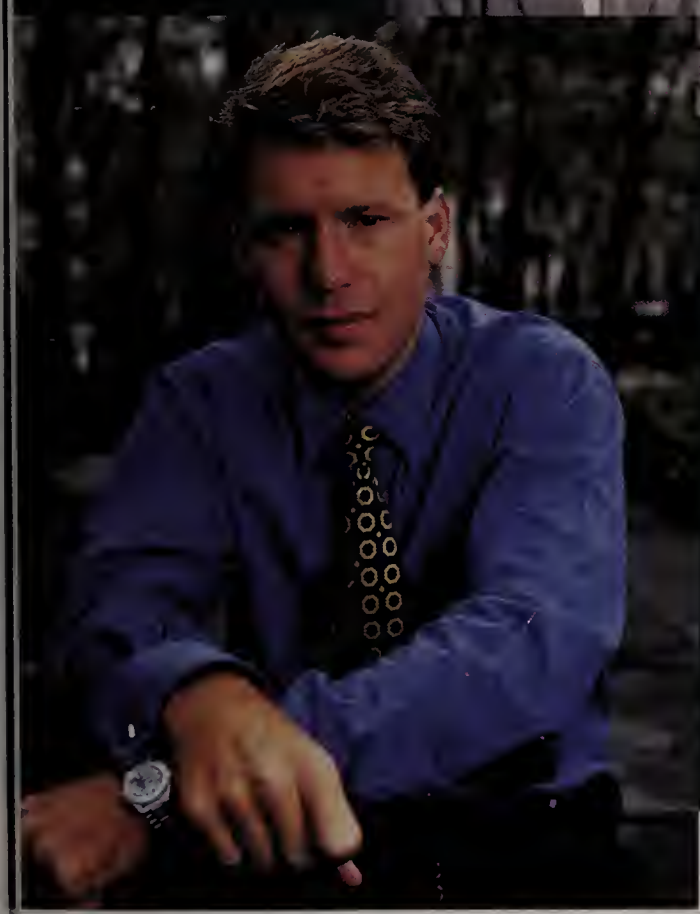
PHOTO ON PREVIOUS PAGE BY PHOTONICA

www.web-master.com/

Condé Nast Traveler's piece of the Epicurious universe includes the databases listing premier beaches and islands, editors' picks for favorite destinations and a *Condé Nast Traveler* ombudsman who offers online advice in response to complaints such as, "We booked an inaugural cruise but got an old ship in shabby condition" and "I had clothes made in England, but when I got home they didn't fit."

The site uses some of the same research information that has appeared in the magazine, but it no longer duplicates the content. However, everything in the *Condé Nast Traveler* site remains yoked to the *Condé Nast Traveler* brand name—no surprise, since both the hard-copy and online versions of the magazine target, as Chubb puts it, "the discerning traveler who really wants advice from the experts."

At CondéNet, Joan Feeney, left, and Sarah Chubb found the Web to be a more open environment than print.



Like his competitors at CondéNet, Travel & Leisure*'s Tim Albright expects that it won't be long before the magazine's Web site starts to book airline flights, hotel rooms and other travel services.*

CondéNet's business model is diverse and, like most Web strategies, fluid. For a price, CondéNet will allow advertisers to build "bridge pages" between on-site banners and advertisers' home pages. For example, the Robert Mondavi Winery built a Mondavi page inside Epicurious. "Instead of going to the Mondavi corporate history home page, [users] go to an area right on CondéNet's own server to see a Mondavi-sponsored promotion about pairing wine with food," Chubb says. "If they want to go see the rest of the [Mondavi] site, they can, but even if they never go, they've gotten really useful information about the products." And, of course, if they don't go, they remain on the CondéNet site.

Condé Nast, which runs Epicurious on three Sun Microsystems Inc. Sparcserver 20s and one Sun UltraSparc server, provides 5MB of server space for such promotional areas to any advertiser that buys a banner ad for three months. The banners, Chubb says, sell for $5,000 a month on the Epicurious Travel site and for $7,500 per month on the Epicurious Food site.

And this year, the company plans to experiment with two other potential revenue streams: online booking, which would be handled by a third party and would give Condé Nast a bounty for each transaction; and fees to a private club whose members would have access to special chat groups and would receive newsletters and other benefits.

Chubb acknowledges that switching business models twice in the first year took its toll in time and effort, but she asserts that the publisher would make the same journey again. "We're glad we had two models to test," Chubb says. "In this year of very explosive growth, the people who have been in there trying and testing new things are much better off than the people who are just now getting started."

Travel & Leisure

AT FIRST LOOK, *Travel & Leisure* appears to be spread all over cyberspace, but there's a strategy behind the scattershot approach.

The monthly travel guide is owned by American Express Publishing Corp., and its online content appears both on its parent company's Web site and on the American Express ExpressNet site on America Online (a service that may gradually move over to the Web). But *Travel & Leisure*'s most impressive format appears on the Pathfinder Web site, where it sits beside the electronic versions of Time Inc. publications *Time*, *Money*, *People* and *Sports Illustrated* and CNN Online, among others. *Travel & Leisure* provides the content, design and HTML coding for its slice of the Pathfinder site, but site owner Time Inc. New Media manages it. The financial arrangement requires neither company to pay the other, and the two entities split ad revenues down the middle.

Unlike *Condé Nast Traveler*, the *Travel & Leisure* site—reachable by clicking a generic "travel" button on the Pathfinder home page—does contain electronic versions of its print articles, but all have been modified. The online texts are shorter, and recommendations and highlights are extracted for easier linking. For example, a piece about Chica-

PHOTOS BY NEIL BECKERMAN

go includes home-page links to restaurants, shopping, "the art scene," night life, local weather reports, "Five Great Hotels" and a three-day itinerary.

The site also includes "Eat, Shop & Sleep" recommendations that are updated monthly, weather guides that are updated daily and an "Ask *T&L*" advice column.

The *Travel & Leisure* site benefits from the Time publications sites' traffic and talent. Visitors first find *Travel & Leisure* by linking from the Pathfinder home page, and Tim Albright, who until last month was manager of new media, says he draws on the parent site's expertise in technology and management.

"We think that the best use of our assets, and the quickest deployment, is through partnership rather than through in-house investment," he says. "By partnering with outside people, you've got access to the nimbleness that you may not have internally."

Encouraged by its new media results, *Travel & Leisure* has forged other partnerships outside Pathfinder, such as a deal with CinéWorld Inc., to develop multimedia products based on that publisher's Great Cities of Europe series.

Albright expects that eventually the *Travel & Leisure* site will handle booking for airlines, hotels and other services, as his competitors at CondéNet intend to do. But he adds that the company has no specific plans for such arrangements at the moment. (Web users can, however, reserve and pay for airline tickets through Pathfinder's link to the site of American Travel Corp.'s PCTravel service.)

And while *Travel & Leisure*'s site has so far attracted little advertising, Albright is hopeful that that will change. His main goal, he says, is easy to articulate: It's a positive revenue stream.

National Geographic

THE NATIONAL GEOGRAPHIC SOCIETY takes a different approach to attracting visitors: It plays off readers' fascination with the stories behind the stories that appear in its publications and television documentaries. National Geographic Online attempts to take visitors "on assignment" with writers, photographers, scientists and explorers.

For that reason, the National Geographic Society site, launched in June 1996, does not reprint articles from the familiar yellow *National Geographic* magazine, the newer *National Geographic Traveler* or the children's magazine *World*. Instead, the Web team repurposes the information in those stories (and some that doesn't make it into the original stories) and packages it in interesting and Web-friendly ways.

"Very rarely will we institute an editorial project on our own," says Larry Lux, vice president of National Geographic Interactive. "We're trying to leverage off what goes on elsewhere in the society. [At any given time], we might have 50 teams out in the field doing stories and research."

For example, when *National Geographic Traveler* ran a piece on whitewater rafting on Idaho's Selway River, Lux's team built a complementary interactive feature with animated boats, maps, a point-and-click guide to gear, photo tips, video clips of running rapids and RealAudio clips of eagles and thrushes native to the region. In another feature, site visitors accompanied an explorer and a photographer on daily dives to recover gold and silver coins from a Spanish galleon that sank in a hurricane in 1641 off the coast of what is now the Dominican Republic. Visitors were able to chat live with the explorers aboard the dive ship, learn about hurricanes and enter a competition to receive a few of the salvaged coins.

"We have this treasure trove of information that's available to travelers," says Lux, who launched his site on six Sun UltraSparc 170 servers. "But at the same time, we don't take the Fodor's or Berlitz or AAA look at things."

National Geographic Online doesn't expect to partner with car rental agencies or restaurant lists. It has, however, forged an alliance with The Weather Channel, linking to such information as weather reports for the Selway River and hurricane data for the Spanish galleon feature.

While the National Geographic Society is a nonprofit organization, its interactive division—like its television division—is a separate, for-profit enterprise. Whether it will actually generate profits remains to be seen.

In its first few months, the site received advertising from Toyota Motor Sales USA Inc. and Apple Computer Inc., and it is trying to solicit sponsorships along the lines of TV's *Hallmark Hall of Fame* or *Chrysler Presents*. The American Plastics Council, for example, sponsored an interactive module on the 500-year-old Inca mummy found frozen on a Peruvian mountainside last fall.

Lux says he finds the early advertising response encouraging. But he acknowledges that, with the considerable costs of launching the site and hiring a 40-person staff, he doesn't expect to see a return on investment in the near future.

"There's no reasonable expectation that we'll make money this year," he says. "I don't think we'll make money next year. I'd like to think that by the end of 1998, we'll be running on at least a break-even basis." WM

FINDING IT ONLINE

Condé Nast Traveler
travel.epicurious.com/travel/g_cnt/home.html

Epicurious Travel
www.epicurious.com

National Geographic
www.nationalgeographic.com
or GO NATIONAL GEOGRAPHIC on CompuServe

Travel & Leisure
pathfinder.com
or keywords Travel & Leisure, T&L or TL on America Online

Travelocity
www.travelocity.com

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THE FIRST IN A SERIES OF ARTICLES THAT UNTANGLE THE MYSTERY OF WHAT WEBMASTERS ACTUALLY DO BY MATTHEW CUTLER

The 7 Pillars of Webdom

In the rush to define everything about the World Wide Web—technology standards, business models, rules of conduct—one area remains largely overlooked: the webmaster profession itself. When it comes to determining the human resources necessary for a successful venture into Internet-related areas, companies are generally playing it by ear. Organizations are mining their IT groups for some technology skills, hiring in or contracting out for others, and cobbling together business, design, and content talent wherever they find it. As for the title "webmaster," it has been applied to employees at all levels, from HTML authors to directors of electronic commerce.

Such confusion is understandable considering the newness of the medium. Furthermore, the Web embraces so many skills and serves so many ends that trying to embody all your Internet-related requirements in a single job description is analogous to seeking a CEO, CIO, vice president of marketing, software engineer and graphic designer all rolled into one neat package.

At The Webmasters' Guild, we have developed a functional model of the webmaster role in our efforts to define and promote the profession. Generally, we view the webmaster as the group of people—including but certainly not limited to business strategists, marketers, programmers, writers, salespeople, librarians, graphic designers and software developers—responsible for the ultimate success of a particular Web site or sites. This group moves constantly through what we call the "iterative metacycles" of planning, implementing and maintaining an organization's Web presence.

PART ONE: EVANGELISM

This is the first in a seven-part series of articles in which Webmasters' Guild President Matthew Cutler discusses the tasks and responsibilities of the webmaster function.

WEBMASTERS' GUILD

At the same time, because the craft itself is so new, webmasters must wrestle with such knotty professional issues as evaluation benchmarks and formal certification. As a result, their task is akin to being charged with curing cancer while simultaneously writing a new Hippocratic oath.

To help practitioners and the public understand the webmaster's mandate, we have identified seven core areas for which the webmaster team is responsible: evangelism, business strategy, domain expertise, content, information architecture, design and technology. What follows is the first in a series of articles defining those areas.

ILLUSTRATION BY SCOTT MENCHIN

Evangelism

BEFORE YOU SELL anything on the Web, you must first sell the Web initiative itself—to the powers that be who will fund it and to the employees who will support it. The good news is that increasing familiarity with the Web—what it's supposed to do, if not what it is or how it works—is making that job easier. The bad news is that there are still plenty of people who do not get it, fail to see the potential or are terrified that a 14-year-old sociopath will hack into their corporate data. Those facts, coupled with executives' queasiness about allocating scarce funds to a project whose ROI may not be immediately apparent, means Web evangelists will be fighting uphill battles for some time to come.

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Web evangelist: one who garners resources and support for the Web initiative in-house and one who builds a user base outside organizational walls. Both types can come from anywhere—although the latter usually lives in marketing—so long as they have a firm grasp of the company's mission and a familiarity with its culture. The evangelist may be an engineer on a skunkworks project who wants to extend a localized success to the entire organization. It may be the CEO who can't format a floppy disk but recognizes that this technology is important for the business. It may be an outsider, such as a consultant. It may even be an enthusiastic family member (for example, my father and I often discuss ways that his organization could better exploit Internet-related technologies).

In articulating the benefits of Web technology, an evangelist obviously needs strong communication and formal presentation skills, not to mention a compelling case for investment, which is usually worked out in collaboration with the business strategist. He or she must also be a master of expectation management, creating excitement and anticipation around the Web project while not overpromising. That means disillusioning executives who expect the electronic marketplace to triple their profits and explaining to CFOs why it's impossible to create a full-service transactional Web site on a shoestring. It also means performing constant sanity checks with the team doing implementation and design to make sure that delivery deadlines are reasonable and that the desired functionality can be achieved.

But being a good communicator is not enough: a Web evangelist must also be empathetic. The Web, and intranets in particular, can create dramatic change in organizations, and love of change, as we all know, is not wired into everyone's genetic code. Telling people that they'll learn it, live with it and inevitably grow to love it is more likely to breed resentment than enthusiasm. Instead, the evangelist must make concrete the advantages of the Web, not just for the company as a whole but for individual departments—even individual employees.

As the intranet initiative progresses, evangelism increasingly becomes a matter of internal marketing.

The evangelist must also be deeply involved in training efforts, making sure not only that people want to use the Web but that they have the expertise to do so. Also, in order to jump-start usage once the Web system goes live, the evangelist should be involved in developing enticements and incentives, such as bonuses, contests and award programs.

As the intranet initiative progresses, evangelism increasingly becomes a matter of internal marketing. The evangelist is responsible for keeping everyone up-to-date on the project's status through such mechanisms as newsletters (both e-mail and paper) and special events (see "Evangelical Fervor," Page 46). In addition, he should track departments' intranet usage to see who is exploiting the technology and then focus education resources on those who are not. Finally, the evangelist must showcase the project's results, even if they are no more concrete than staying ahead of the competition or being strategically positioned with regard to the technology.

Webmaster evangelism applies equally to promoting an external site to potential customers, which means doing everything possible to get visitors to come often and stay late. That includes making sure that the site is listed with all search engines, that relevant sites are linking to it and that the company's Web address appears on business cards, marketing collateral and the like. It also means making sure the site is as hospitable as possible, with no lurking obstacles to user access such as broken links, "Under Construction" signs or a clunky, nonintuitive URL.

As a company's Internet activities become more elaborate and sophisticated, the evangelist's role will change accordingly. Instead of fighting for basic connectivity, for example, evangelists will find themselves supporting investments in cutting-edge technologies like Virtual Reality Modeling Language, Shockwave and Java. Some recommendations naturally will come from consulting with the team's technical element. But the evangelist must also scope out competitors' sites, determine how to match or exceed their efforts and then make a case to the powers that control the budget.

Because of the need for resources and support, evangelism is where every major Web effort begins. But like the other webmaster functions, evangelism doesn't end with implementation. A Web site is never finished: There will always be something to sell. WM

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*Matthew Cutler is president of The Webmasters' Guild Inc. (*www.webmaster.org*), the country's first professional organization for webmasters. The Guild is a nonprofit organization dedicated to educating, promoting and unifying the global webmaster community. Cutler is also a founder and director of business development at Net.Genesis Corp., a provider of Web performance and usage analysis software (*www.netgen.com*). He can be reached at* mcutler@webmaster.org *or* mcutler@netgen.com.

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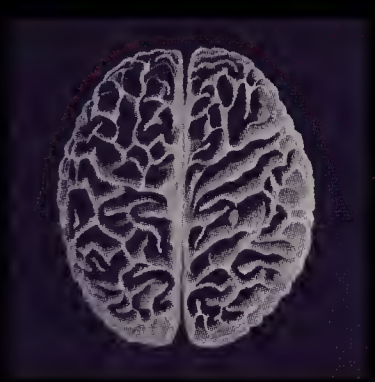

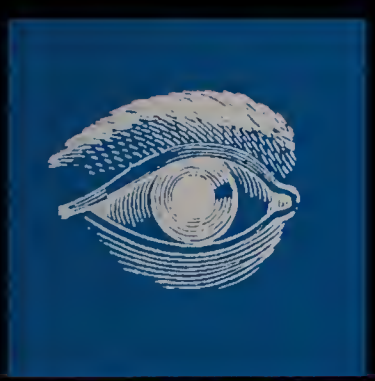

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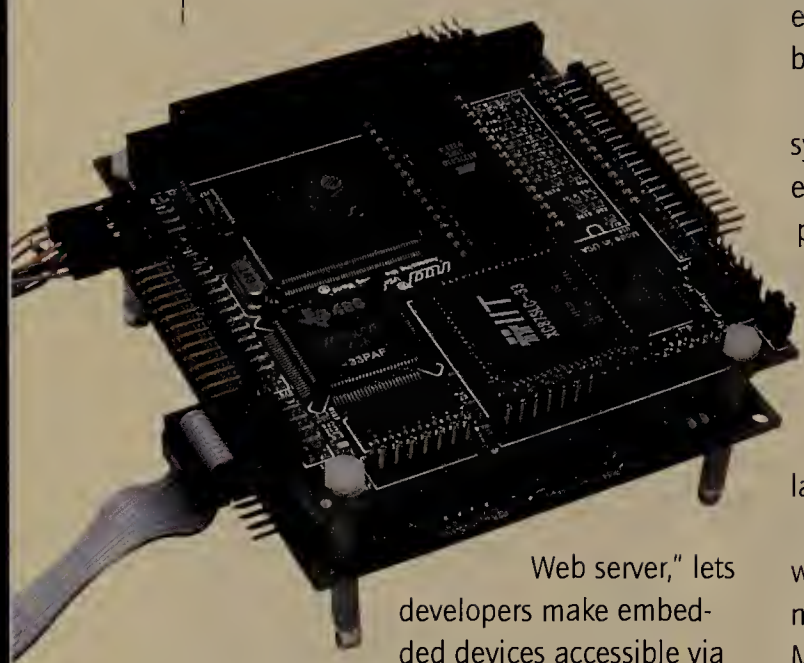
Continued from Page 68

SMALL IS BEAUTIFUL

Size—particularly the lack of it—has long been a strong selling point for technology. Why should the Web be any different?

A new product from Phar Lap Software Inc., billed as "the world's smallest Web server," lets developers make embedded devices accessible via the Web. Embedded devices are intelligent systems that operate things as exotic as weather stations and as mundane as office copiers, and the big complaint is that interacting with them is a pain. Phar Lap's product, the TNT Embedded ToolSuite Realtime Edition, addresses that problem by making the devices accessible to users with Web-like ease over any PC or workstation with a browser. The tool suite sells for $4,995.



Possible applications include security systems (technicians controlling cameras), health care (medical staff tracking patients' vital signs remotely) and manufacturing (factory personnel monitoring cell controllers, machine tools and picker-stackers). In the office, employees could send documents to a copier, collate, staple, reduce or enlarge—all from their desktops.

Phar Lap has already deployed a weather station controlled by the technology outside its office in Cambridge, Mass. Anyone wanting to give it a spin may do so at *smallest.pharlap.com*. For more information, surf over to *www.pharlap.com* or call 617 661-1510.

A DISTRIBUTIVE PRINCIPAL

While some regard the Web as hyped beyond its deserts, few question its value as a software distribution vehicle. A new product from Megasoft Online LLC aims to make that distribution process even easier.

The company's Web Transporter is a client/server application that lets IS types distribute and install software and other electronic files across the Internet and corporate intranets. The server component acts as an electronic clearinghouse, maintaining software libraries (data files, documents, conventional executables or Java applets) while allowing managers to update, modify or withdraw files easily. It also handles the security piece—authenticating users and controlling access while providing version control, activity reports and delivery confirmation. The client and server modules are sold as a package that starts at about $20,000.

A plug-in application for browsers, Web Transporter is platform-independent.

For information, visit Megasoft's site at *www.megasoft.com* or call 908 431-5300.

THE UNVARNISHED TRUTH

Web sites are like children: Your own is always the most beautiful. But on the off chance that the rest of the world might not agree, it may be wise to seek objective opinions.

To help you, CLT Research Associates Inc. has introduced WebScore, a service for evaluating the effectiveness—or lack thereof—of Web sites. The company conducts what are in effect online focus groups with a hundred or more consumers. Participants, who are prescreened and represent varying levels of Web expertise, are asked to evaluate a site's overall effectiveness based on a set of attributes that CLT identifies as key: content, technical performance, ease of navigation and graphics. (Feedback is also given on links, games, transactional capabilities and free downloads, where applicable.) These cyber-Siskels then go through the same paces for two competitive sites selected by the client, who receives a detailed report comparing all three.

The basic service, which costs $7,500, includes a chat session with four to six panelists that is meant to deliver commentary on specific elements of a site. The advantage is that you don't have to hide behind a one-way mirror while they're raking you over the coals.

For more information, point your browser toward *www.cltresearch.com* or call 212 779-1990.

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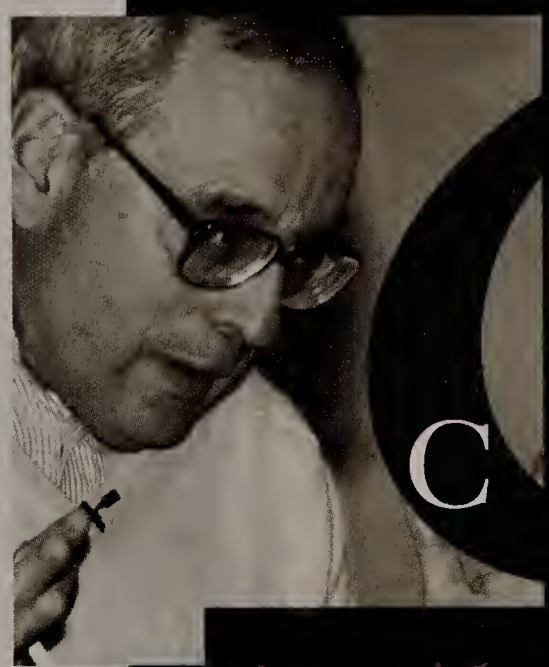

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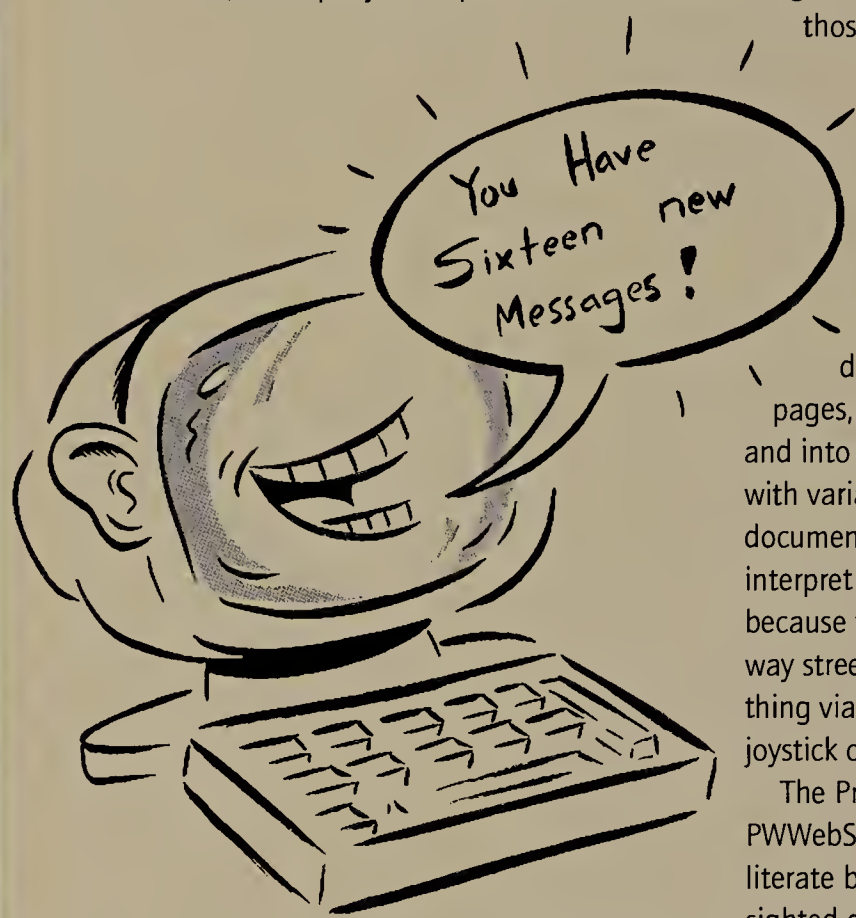
SITES WITHOUT SEEING

Despite the Web's much-lauded universality, some people with disabilities—specifically the visually impaired—are still likely to be left out. The Productivity Works Inc., a company that specializes in interface design, has made a mission of bringing those people in.



The company's PWWebSpeak Version 1.2 makes the Internet accessible to the blind, visually impaired and dyslexic by providing support for auditory and hands-off applications. The browser interacts directly with information on Web pages, translating content into speech and into simplified visual presentations with variable text size. Users navigate documents without scrolling or having to interpret a structured screen display. And, because the Web was meant to be a two-way street, users can do the interaction thing via keyboard, speech recognition, joystick or sip-puff tubes.

The Productivity Works envisions PWWebSpeak being used by keyboard-literate blind people, sighted and non-sighted quadriplegics and mobile workers who need access to Web-based information by phone. The company is targeting commercial and government markets. For more information, check out *www.prodworks.com* or call 609 984-8044.

NOW HEAR THIS

While many of the technical tricks of the Web seem incredible, the progress in audio can seem incredibly slow. With the sound and fury of television setting the standard, our expectations for Internet audio have been a bit ahead of the curve.

But they won't be ahead for long. Several companies, such as Progressive Networks Inc., the Xing Technology Corp., Liquid Audio Inc. and Macromedia Inc. are taking slightly different routes to great sound, despite the much-lamented limited bandwidth of the Internet. Macromedia, the first horse out of the gate, recently added what the company calls "CD quality" sound to its popular Shockwave multimedia tool. The new edition of Shockwave uses two technologies—streaming and compressing—to make audio files sing, even when they come through a 14.4Kbps throat.

Don't believe it? Skeptics can hear for themselves how Warner Brothers, Capitol Records and other recording companies have put the tool to work at Macromedia's Web site, *www.macromedia.com*. If you like what you hear, the new plug-in, available for Microsoft Corp.'s Windows 95 and Windows NT platforms and Apple Computer Inc.'s PowerPC and Macintosh 68K platforms, is free for downloading.

Continued on Page 66

IDENTITY CRISIS

We all know the benefits of giving people access to information that lives inside our companies. The challenge is letting Tom in to see the royal jewels while keeping Dick and Harry on the other side of the moat.

The answer, of course, is authentication—itself a challenge that organizations have met with trust webs, key encryption and various other solutions. ActivCard Inc. takes another approach: The company creates "tokens" that authenticate users of multiple services over all communication networks, including the Internet, intranets, LANs, and public switched and cellular networks.

Tokens are handheld devices with calculator-style keypads that use the Data Encryption Standard algorithm to generate one-time-use passwords (based on challenge response or event-time asynchronous modes). Network administrators perform token initialization and set security parameters through a coupler that allows data exchange between the token and a computer's serial port.

The product can be used to vet people seeking access to sensitive information and authenticate users of electronic data interchange. Credit-card numbers can be stored inside an ActivCard token for electronic commerce applications.

ActivCard operates in all major computer environments. For more information, see them at *www.activcard.com* or talk to them at 415 654-1700.

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A worldwide Intranet data warehouse? Eli Lilly won't wait.

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Dave Baker
Project Leader,
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Eli Lilly Corporation

To develop Web applications TODAY, they use Bluestone's Sapphire/Web.

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What kind of people would try to run their business with client/server/web applications?

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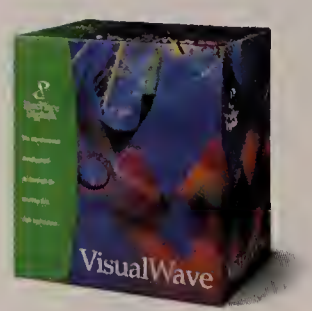

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